

TAX POLICY *Handbook*

Edited by

Parthasarathi Shome



**Fiscal Affairs Department
International Monetary Fund**

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Parthasarathi Shome

**Tax Policy Division
Fiscal Affairs Department
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Preface

This Handbook was written primarily for economists who are responsible for analyzing and evaluating economic policies of developing countries at an applied level, and who would benefit from a comprehensive discussion of the concepts, principles, and prevailing principal issues of taxation. It attempts to provide a systematic exposition of important tax policy issues selected for their theoretical foundations and their practical relevance, and brings the reader closer to some of the recent advances in the theoretical literature on tax policy. Its basic goal is to present clarifications, elaborations, and integrations of concepts rather than to make a textbook presentation of a voluminous and diversified body of literature on taxation. In particular, it attempts to address certain technical issues on which adequate treatment may not be easily available from conventional sources, even though such issues have often arisen in the context of IMF missions.

There are important differences between this Handbook and a good textbook. In particular, the Handbook emphasizes hands-on applications of principles of taxation for the applied economist in situations involving actual policy advice; groups topics as they are likely to arise rather than solely on the basis of their conceptual interrelationships; and presents the material in a manner that should help the applied economist easily turn to it for reference and guidance.

It is hoped that the readers of this Handbook will be better informed to discuss tax policy issues with country authorities. Nevertheless, the views expressed are the responsibility of the authors and not necessarily those of the IMF.

VITO TANZI
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INTRODUCTION

Introduction

PARTHASARATHI SHOME

The scope of the Tax Policy Handbook includes a consideration of the theoretical underpinnings of taxation but encompasses the broader perspective of taxation issues of more practical interest. This introduction, Chapter I, attempts to conceptualize the driving force behind selected topics and, in the process, draws attention to important prevailing concerns in taxation and summarizes the coverage of the various chapters.

Tax Policy, Tax Revenue, and Tax Reform

The justification for taxes lies in a government's need for resources to carry out its essential functions. Nevertheless, there are many costs to taxation. These costs reflect the direct cost of tax collection as well as the effects on the efficiency of resource allocation and on the equity of income distribution. Estimates of the welfare cost of taxation—defined as the excess cost to society of collecting \$1 of tax revenue—seem to be about \$0.50, according to some studies for the United States.¹ It is surprising, therefore, how governments tend to forget or seem to ignore taxation costs. For example, to reduce the fiscal deficit, before curtailing expenditures, often governments tend to immediately identify new tax measures. The counterargument that reducing expenditures could impose costs on society as well could, of course, also be made.

Governments seem to regard fiscal policy as "their" policy within the mix of macro policies. This is because fiscal policy is more amenable to direct action, its results are often more clearly visible, and its impact is felt more quickly. Further, within fiscal policy, a tax revenue increase, though not always easily introduced, is generally easier to implement than the politically more difficult expenditure cuts. This is especially so, as increasing proportions of the expenditure budget reflect debt service and other costs, limiting the possibility to maneuver. These factors explain country authorities' heavy focus and concerns on taxation issues.

Therefore, in the post-Second World War era, there has been a pervasive presence of tax reforms more often than not brought about in the context of the need

for increased revenue. Examination of actual country cases would reveal that most countries that carried out tax reform with the stated objectives of improving the efficiency, equity, neutrality, and administrative feasibility (simplicity) of their tax systems also experienced a perceptible increase in their tax revenue to GDP ratios. Thus, even though tax reform need not necessarily be linked to revenue increase, in effect, this seems to have been commonly the case.

The fascination with tax revenue increase is understandable in cases where governments that undertake reform have been preoccupied with a downward slide in tax revenue attributable to a prevailing cumbersome tax structure that they wished to correct. However, where the tax structure is broad-based and relatively neutral, tax revenues have been stable and opportunities for expenditure reduction exist, the focus of fiscal reform has to be on the expenditure side because of the remarkably high costs associated with taxation.

In what follows, Chapter II presents the conceptual ramifications of taxes by surveying how taxation affects efficiency, equity, intertemporal decision making, and the like. Subsequent chapters consider more technical issues in the context of particular taxes. Chapter III focuses on the taxation of consumption and production, describing not only the broad differences among major taxes such as the sales tax, value-added tax (VAT), and excises, but also draws attention to the details of various technical complications that arise in the way they function. Chapter IV examines income, property, and social security taxes or, more precisely, those issues that most commonly arise in the context of providing technical assistance to policymakers. Chapter V deals with policy issues in international trade taxation which have been reflected in tariff reforms implemented in recent years in many parts of the globe. Chapter VI selects topics that do not comprise an integral part of the preceding chapters but are nevertheless important in their own right. Chapter VII summarizes the main trends in global tax reform and sketches the nature of IMF tax policy advice. An appendix reports recent tax revenue data in terms of GDP and total tax revenue across groups of countries between 1975 and 1992.

¹See, for example, Baillard, Shoven, and Whalley (1985a and 1985b), and Hansson and Stuart (1987).

General Issues and Concepts: Theoretical Underpinnings

This Handbook explains the conceptual basis for taxation in Chapter II.

Efficiency, Equity, and Incidence

The concepts and measurement of the efficiency cost of a tax were developed in many stages over many years. Efficiency cost refers to the reduction in a consumer's welfare over that which can be related solely to his lost income as a result of the tax. It is, therefore, variously called "deadweight loss" or "excess burden" of a tax. It arises from the change in the relative prices between taxed and untaxed commodities in the post-tax situation. The commonly used measure of excess burden is the "Harberger triangle"² which uses the concept of the loss in consumer surplus as a result of the tax. It varies positively with the pretax price elasticity of demand and the tax rate. The measure has its detractors, however. This is because it can be different from the monetary compensation that a taxed consumer would require to make him as well off as he was before the tax. These compensation measures—"equivalent variation" and its later variant, "compensating variation"—were initiated by Hicks³ and later developed by others. Zee elaborates on these concepts.

The equity considerations of taxation comprise pre-occupations with whether taxpayers with similar incomes are treated equally under the tax system—"horizontal equity"—and with ensuring that taxpayers with unequal incomes are treated differentially—"vertical equity"—often through the income tax side of the tax system. The vogue of the post-War era was to design tax systems that considered both of these aspects of equity. The result often was a rather complicated tax structure, too cumbersome to administer and not revenue productive. Zee also examines these aspects.

Also, the true incidence of such structures was difficult to derive, possibly because the "nominal" and "effective" tax rates were vastly different. Two distinct movements were developed that tried to measure a tax or a tax system's true incidence, one by Harberger⁴ that used a rudimentary general equilibrium framework, and another by Musgrave⁵ that also used a rudimentary approach by preassigning incidence of various taxes in a tax system across different consumer groups. Even though both approaches have been much

extended, finessed, and applied to examine many country tax structures, important difficulties remain with both approaches since both are dependent on a number of strong assumptions. These assumptions include elasticities of demand and supply as well as of factor substitution, the ability of factors to move across sectors, the existence of risk and uncertainty in production, and the realism in preassigning of tax incidence. Krellove considers the various aspects of incidence. The indeterminate nature of the ramifications of important elements of taxation seem to emerge from these considerations.

Static Versus Intertemporal Effects of Taxation

The efficiency and equity effects of taxation are usually cast in a static context. Many effects of taxation, however, are essentially intertemporal, such as on interest rates, savings, capital accumulation, or economic growth. Also, it is sometimes important to track the path of relevant economic aggregates as a result of a tax to fully appreciate its effects. A simple example demonstrating this issue is an inefficient tax that can raise revenue in the short run but leads to a slowdown in economic growth and, ultimately, in revenue. Further, the development of endogenous growth models has made possible the linking of long-run growth to present and future tax and fiscal measures and to expectations of future events.⁶ This suggests that the growth effects of taxation could be permanent, rather than merely transitory, as previously believed.

An important element of taxation of savings has been associated with David Ricardo whose view, in effect, was that a current tax cut financed by government debt has no real effects. It does not change the economy's path—Ricardian equivalence—because private agents are rational, anticipate higher tax liabilities in the future, and adjust their behavior accordingly. This equivalence has been picked up by contemporary economists and, even though its empirical verification remains unproven, it could approximate the actual behavior of the economy depending on the circumstances. For example, first, if the planning horizon of the economic agent is his life cycle and he saves for retirement, then the equivalence is likely to break down if the likelihood of taxes is seen to be remote during his lifetime. On the other hand, if a bequest is the motive for saving, the equivalence is likely to be valid. Second, if households face liquidity constraints, a tax cut would increase their consumption as though in effect the government has borrowed on their behalf, in

²See Harberger (1974).

³See Hicks (1946 and 1956).

⁴See Harberger (1962).

⁵See, for example, Musgrave, Case, and Leonard (1974).

⁶See Xu (1994) for a survey of the literature on tax policy in the context of endogenous growth models.

opposition to the equivalence. On the other hand, without a liquidity constraint, the equivalence is more likely to hold.

Intertemporal substitution effects play a role in the area of capital income taxation. The tax treatment of capital income affects capital accumulation and growth since savings have been found not to be inelastic with respect to the interest rate.⁷ Empirical evidence as well as analytical considerations point to a larger welfare cost of capital taxation than had previously been anticipated. The postulation of altruistic links between successive generations tends to exacerbate these findings.

The classical theory of economic growth considered technological change, human capital accumulation, and similar growth-inducing factors to be generally outside the realm of economic policies. The new theory of growth recognizes such factors and, although it is still early for conclusive results, it sheds light on the effect of taxation on the long-term growth prospects of an economy. Escolano analyzes the dynamic or intertemporal effects of taxation, especially in instances where static analysis might lead to erroneous conclusions.

Taxing Expenditure or Income

If the income expenditure equation of an economy is considered, meaningful questions that should be posed would include the following: which side of the equation should be taxed, which side is easier to tax, or whether there is a rationale for taxing both sides. There are pros and cons to taxing consumption expenditures as an alternative to income taxation.⁸ Even John Stuart Mill was concerned with this issue. Among the pros, first is the exemption of savings under the expenditure tax in contrast to the double taxation of investment returns under the income tax. Second is the possibility of designing even the expenditure tax with a progressive structure. Nevertheless, the cons comprise doubts that have always been raised regarding this matter. First, proponents of the income tax rely on the Haig-Simons definition of income as accretion of power to consume and, therefore, think of income as the proper equity criterion for taxation. Second, the expenditure tax is seen as a payroll tax from a lifetime perspective excluding bequests and inheritances and, therefore, causes undue burdens on wage earners.

⁷Changes in the after-tax interest rate, prompted by capital income taxation, could have important dynamic effects and savings could not be represented as a stable function of the contemporaneous return on capital. See Tanzi (1991), for example.

⁸This could also be cast as a debate between the efficacy of taxing personal cash flow versus taxing personal income.

In India and Sri Lanka, where the expenditure tax was applied, the definition of the tax base foundered on its conceptual basis, and it was revoked. In practice, the income tax has been more commonly implemented, while the expenditure tax has been only temporarily tried in a handful of countries. Nevertheless, when expenditure taxation was tried within the narrower range of consumption, it became easier to conceptualize as well as to implement in particular forms, such as the VAT, because of its cross-control feature. Many countries have now introduced the VAT which exists side by side with the income tax. Particular groups of countries, for example in Latin America, have spent much of their tax administration resources on the VAT, which has become their main vehicle for generating revenue while others, such as in Asia and Europe, have continued to use the income tax as the main revenue generator. This is not to say that the scope of the VAT is not increasing even in the latter countries.

On a purely conceptual basis, taxing both the income and the expenditure side of the equation may smack of double taxation. As was just described, however, in practice, it has not stopped tax practitioners short of using taxation of both. This is perhaps because what is conceptually clear and correct may not always be easily implemented. The practice of taxation reflects a combination of what is implemented with the intermittent incorporation, in the form of tax reform, of concepts developed through the progress of tax theory. Thus, it has always been common to tax both income and expenditure, using all revenue sources alike. Only a couple of countries have actually confined themselves to taxing either income or expenditure and this could turn out to be temporary. Escolano considers the conceptual issues related to the taxation of income or expenditure.

Taxation and Risk Taking, Imperfect Markets, and the Second Best

Profits are in part a compensation for bearing risk. A tax on the return from an undertaking taxes risk taking. Thus, there has long been a concern that capital income taxation leads to a reduction in risk taking. Nevertheless, the new literature in this area demonstrates that, on the one hand, if the tax system shares sufficiently in the risk of an investment as well as in the expected return, when loss offsets are partial, it is not impossible that taxing the return on risky assets can actually increase risk taking. On the other hand, even when there is effective full loss offset for "income risk," tax systems, as they are usually designed, imply that a government rarely shares completely in "capital risk." When risky returns are taxed so that a government is sharing in risk, tax revenue is uncertain. In sum, the

recognition of investment as a risky business modifies many of the conventional results of capital taxation and the revenue it can generate.

Another situation in which conventional wisdom on the effects of taxation fails is the existence of an imperfect market. It is often assumed that a monopolist can just pass on a tax to consumers. It can be shown, for example, that an excise tax would tend to be borne partially by a monopolist and that the form of the tax—ad valorem or specific—would determine its extent. This is because, for any given revenue raised by the tax, the monopolist's output will be higher with an ad valorem tax than with a specific tax. Similarly, in the case of a partial tax on a factor of production, such as the corporation income tax, or a more general tax, such as an income tax, the ultimate incidence will depend on the market form.

An area that has attracted much attention in the development of taxation theory is how taxation affects efficiency in an environment in which efficiency did not initially exist. This is the theory of the "second best." By nature, second-best policy involves an investigation of the interactions among market distortions. Hence, it is inherently general equilibrium. Rationalization and formulation of algebraic constructs have led to some interesting conclusions. First, if a tax distortion exists in one market, adding another tax can be beneficial in improving efficiency. Second, if several taxes exist, removing one distortion may not be beneficial. Third, policies that would not be desirable in a distortion-free world may have a role to play in a second-best environment. Fourth, policy design in a second-best world is complex and not at all obvious. These facets of tax theory, based on the seemingly unusual or extraordinary, yet representing an everyday occurrence in a representative economy faced by the policymaker are discussed by Krelöve.

Domestic Consumption and Production Taxes

Chapter III, on domestic consumption and production taxes, covers a wide range of issues reflecting methodological advances as well as particular details that have emerged in the course of IMF technical assistance in the context of consumption and production taxes.

Optimal Taxation

A segment of taxation literature—"optimal taxation"—has emphasized that the minimization of effi-

ciency cost of collecting revenue should be the main criterion for determining the structure of tax rates. Optimal tax rules based on elasticities in a mix of producer prices—fixed or variable—have been developed. As expected, the lower the elasticities of demand, the higher the optimal tax rate on a commodity—the "inverse elasticity rule," which is based on special assumptions. Those who believe in optimal tax rules do not consider the need for multiple rates to be a forbidding enough property that the rules themselves should be discarded. The critique that the rules may lead to some regressivity led even to the incorporation of income maintenance elements in the rules. They have recommended tax structures based on optimal taxation theory in selected developing countries. Thus, optimal taxation comprises an interesting chapter of tax policy that must be examined. Zee provides a critical examination of the theory of optimal commodity taxation.

General Consumption Taxes

The VAT ideally taxes the value added in every stage of production and distribution which implies that the taxpayer would have to be given credit for the taxes he pays on his purchases. Many countries have moved from sales taxes levied at a single stage in the production-distribution chain to a VAT mainly for reasons of tax administration.⁹

Many countries that introduced the VAT, however, preferred to opt initially for a "production"-type rather than a "consumption"-type VAT mainly for revenue considerations. The production-type VAT typically does not allow credit to be given for capital goods purchases. This leads to "cascading," that is, some value added is taxed more than once because the tax base calculation at every stage of production fails to exclude all the value added that had been taxed before. The extent of cascading itself depends on the elasticities of demand and supply, the ratio of taxed to untaxed inputs, the number of stages in the production-distribution chain, and other factors. Zee delineates the concept and measurement of cascading.

There are other complications in the design of a VAT. Multiple rates make the tax difficult to administer, robbing it of the simplicity of cross controls. Important differences occur if a good is "zero-rated"—credit is given for taxes paid on inputs even though tax on output is zero, as opposed to if it is "exempted"—the output is not taxed but neither is credit allowed for taxes on inputs. The calculation of the net tax liability based on the

⁹The sales tax seems to be left in operation at the provincial level, while the VAT operates often at the federal level.

"credit method"—gross tax liability minus taxes already paid on purchases, as opposed to the "subtraction method"—using income and cost for the calculation of net tax—would lead to differing effects of exemption versus zero-rating at different points in the production-distribution chain. A narrow tax base reduces the neutrality of the VAT and renders its administration difficult. Very often, countries have had to deal with declining bases reflecting political reasons. A whole methodology for the estimation of the "theoretical" VAT base compared with actual revenue collected has developed to estimate VAT evasion. McMorran and Zee discuss issues that bear on general consumption taxes.

Excises

The inverse elasticity rule derived from optimal tax theory is conveniently applicable in the case of selective excises. For example, traditionally, selective excises have been favored in addition to a broad-based sales tax or VAT to tax the consumption of "demerit" goods such as tobacco, alcohol, and gasoline. Their elasticities of demand are low at least in the short run. Thus, high tax rates could be used to generate revenue without diminishing consumption significantly. It should be obvious that this type of tax should be used selectively in order not to burden the consumers of other goods with low elasticities of demand, such as necessities. Indeed, the other face of selective excises is the possibility, or even the desirability, of imposing them on luxuries that may have high elasticities of demand but nevertheless may not be adequately taxed under a low-rated general consumption tax. Various practical issues arise in the design of excise taxes—for example, should they be levied on production or on consumption, on an ad valorem or specific basis—as well as in the consequences of optimal taxation—for example, are there any simple tax structures that may be developed. These are the subjects that McCarten and Stotsky address in this chapter.

Environmental Taxes and User Charges

Environmental taxes apply wherever there are environmental objectives. They are termed "Pigouvian taxes" after Pigou, the classical economist who first enunciated the design of taxes that would internalize the externalities—for example, pollution—associated with economic activities, by equating their private and social costs. A Pigouvian tax would reduce and, in an extreme case, eliminate the level of pollution depending on whether society regards the benefit to be gained from its elimination to be worth the cost of doing so. Some environmental taxes "earmark" their revenue to

help clean up the environment. In addition, modern environmental tax designs recognize political economy concerns such as potential conflicts with equity objectives. Nellor analyzes various aspects of environmental taxes.

In particular cases such as road maintenance and other selected public services, it has been found that charging users according to the extent of use is efficient—the "benefit principle"—without sacrificing considerations of equity. Common issues, such as in the event of the provision of technical assistance, include methods to adequately identify the user, measure the intensity of use, safeguard fairness, and develop a topology of appropriate user charges. Bell covers considerations relating to user charges.

Income and Wealth Taxes

The longest surviving discussions in the area of taxation policy have perhaps been on how best to conceptualize and design corporate and personal income taxes. Chapter IV is divided into many sections, which attempt to define the concept of income, deal with various aspects of income taxes, and cover other variants of income and wealth taxes.

Income, Taxable Income, and Optimal Taxation

An issue that affects income taxation considerably is the concept or definition of income during a period. The most widely accepted theoretical basis was developed in early writings by G. von Schanz (1896), R.M. Haig (1921), and H.C. Simons (1938). Schanz-Haig-Simons income is the sum of the market value of rights exercised in consumption and the change in the value of the store of property rights between the beginning and the end of the period in question. Thus, this definition of "comprehensive" income equals consumption plus net wealth accumulated during the period.¹⁰ Alternative definitions of income exist but are not so commonly used. King examines issues regarding the concept of income.

Optimal income taxation examines the trade-off between efficiency and equity. Economic theory yields insights into the optimal degrees of income tax progressivity under different theories of distributive justice. Models rely on assumptions about the distribution of pretax income, the government's objective to maximize social welfare using income tax, and the disincentive effects or efficiency costs of individual work effort

¹⁰The inclusion of net wealth lends the phrase "comprehensive" to the definition.

from the tax system. Zee examines the application of these models.

The normative recommendations of optimal income taxation are reflected in the design of many personal income tax systems. Nevertheless, the design of personal income tax often reflects the outcome of decisions reflecting many other goals beyond efficiency and equity. Personal income taxes may be global or schedular in their basic structure. The concept of taxable income, the treatment of particular types of income, allowable deductions, exemptions, credits, the rate structure and number of brackets, and the neutrality to inflation all differ across personal income tax systems. Stotsky covers the basic structure of the personal income tax.

Design Issues

In the design of the personal income tax, there are, in principle, four different features that determine tax liability: the choice of taxable unit, sources of income subject to tax, tax preferences, and the tax schedule. Thus, issues that matter include the right choice of the taxable unit—household or individual—and its interaction with other features of the tax system such as income subject to tax, income allowances and tax credits, and tax rate structure. Each combination has a different implication for the equity and efficiency of the tax system. Stotsky examines these considerations.

Again, while progressivity is generally accepted as a favorable feature to achieve a minimum of equity, the definition and determinants of progressivity itself have varied. Indeed, sometimes they may yield conflicting results. Thus, one measure, focusing on the distribution of taxes, may yield high progressivity as long as all taxes fall on a few, say the richest decile of taxpayers, even if the overall tax burden is low, say 1 percent of GDP. Another measure, focusing on the after-tax distribution of income, may conclude that the same tax system reflects low progressivity. Expectedly, the appropriate progressivity measure has been a matter of debate. Its particular design will have significant consequences for equity and efficiency. Norregaard covers concepts of progressivity and actual practices in selected developed and developing countries.

The reliance on the concept of comprehensive income does not mean that its measurement is straightforward. Measurement of income can be complex in the context of a business or corporation. First, correct valuation of assets and liabilities is not obvious and it may be based on different criteria such as economic value, original cost, market value, value to the owner, replacement cost, or other bases. Second, assets and li-

abilities may be designated in monetary or real terms and inflation will affect their values differentially. An improper inflation adjustment will mismeasure profits. Third, timing of income generation may be viewed differently, either when it accrues or when it is actually received in cash. If a loss occurs, the appropriate length of time for which it may be carried forward or backward needs to be determined so that risk-taking enterprises are not penalized relative to risk-averse enterprises by the tax system. Problem areas in the measurement of taxable income include the specification of rules regarding how to depreciate different assets over their useful lives (typical methods being straight line, declining balance, and accelerated depreciation), how to value inventories (typical methods being last in first out, first in first out, and period average methods), or how to treat exchange rate changes when a business has assets designated in a foreign currency. A particular selection will have implications for both the business's balance sheet and its income statement. King and Chua focus on aspects related to the appropriate measurement of income and taxable income.

An aspect of corporate taxation that has assumed importance in recent years is the tax treatment—as opposed to regulatory or book treatment—of provisions for possible loan loss, in particular by banks. When financial assets are transacted, their current value is easily ascertainable for tax purposes. Such is not the case for loans, consumer credit, or other financial claims. Some of these may become worthless before maturity if they are obviously uncollectible. It may be advisable to allow some tax deductions for setting aside provisions for loan loss, albeit with specific and transparent rules. Essentially, two methods have been used. The first is the charge-off method, which expenses bad debt only as it becomes wholly or partially worthless. The second is the reserve method, in which a reserve account is set up as an allowance against the eventuality of a bad debt, while all receivables are recorded at their face value until they become worthless. Receipts associated with the risk of making loans are part of interest receipts and take place throughout the life of a loan, while loan losses may be concentrated in particular periods. It becomes apparent that both the charge-off method and the reserve method tend to favor loan portfolios with early loan losses and disadvantage those with late loan losses. Escolano looks at the advisability of tax deductions and of selecting alternative methods, and surveys selected country practices.

Integration of Income Taxes

A factor that is crucial in the design of income taxes is the “integration” of the personal income tax with the

corporate income tax. The problem arises when some sources of income, such as dividends, are taxed once at the corporate level before they are distributed to individuals, and then a second time as individual income. The case for integration is built on many premises, including that corporations have no ability to pay and are simply a conduit through which income flows to individuals. As such, they should not be taxed at all, except as a withholding mechanism for the individual income tax.¹¹ To avoid the double taxation that is caused by taxing both corporate and individual incomes, full or partial tax relief may be given at either the corporate or individual level.¹² The "classical" system, however, prefers not to attempt to integrate the two taxes. This is based on several grounds, including possible revenue loss as a result of integration, the lack of definitive empirical proof that integration would lead to less bankruptcies, as well as the relative ease of administering a classical system. Country experiences reveal the adoption of partially integrated or classical systems. Various forms may be devised essentially to eliminate or reduce the extent of double taxation. Chua and King weigh the pros and cons of integration and present possible models describing the mechanics of integration.

Taxation of Capital Gains, Interest, and Dividends

The definition of comprehensive income should clearly include capital gains on real property or financial assets such as company shares. Nevertheless, reflecting concerns regarding the impact of capital gains taxation on investment, and as the measurement of accrued capital gains is impracticable in many circumstances, income tax systems have tended to view capital gains as a source of income that deserves specific provisions, often exempting them from tax or taxing them at lower rates. For example, owner-occupied residences and government securities are often exempted. On the other hand, if the gains are realized on depreciable assets, tax systems attempt to "recapture" the depreciation allowances by taxing such gains as ordinary income. Differential taxation of income and capital gains is based on the premise that taxable income is a flow from capital sources, distinct from any changes to the value of those sources themselves. If the tax schedule for capital gains is quite different from that of income, then the interpretation as income or capital gains of a particular increase in the business's value assumes importance. Thus, for example, if money made through exchange gains is not taxed until

realized, should it be ordinary income or capital gains for tax purposes? Other variations also appear. Thus, sometimes capital gains tax provisions differ depending on whether the gains are made by individuals or companies. All this leads to structures for the capital gains taxes independent from income taxes as reflected in tax rates, thresholds, inflation adjustments, and appropriate holding periods of the assets to minimize the potential for "locking in" investments and necessitating rollover provisions. King surveys these structural aspects together with selected country practices.

The tax treatment of interest and dividends poses related problems. In corporate tax systems, typically interest payments to the company's creditors are deductible from taxable profits. The treatment of dividend payments varies more widely. A proportion of dividends may be deductible. Or, as in the majority of cases, the payment of dividends may not directly affect the calculation of taxable profits. This implies that corporate taxation has a bias toward debt financing. In turn, this increases companies' incentives to disguise the payment of a return to its owners as "interest." This problem of "thin capitalization" has become increasingly important in the case of foreign subsidiaries, necessitating the introduction of provisions on the part of tax authorities to limit this form of tax avoidance, for example, by introducing a ceiling on the debt/equity ratio. Recently, a new view has emerged, however, that the so-called bias toward debt financing may not be so clear as long as profits are reinvested and the realization of capital gains is indefinitely postponed. Alternative approaches to treat debt and equity financing in a neutral way include integration, the imputation of a deductible interest charge to equity financing, or a corporate cash-flow tax that would render both dividends and interest nondeductible.¹³ King examines the various ramifications of different tax treatments of interest and dividends and also provides a few illustrative country examples.

Other Income Tax Issues

One question that assumed considerable importance in the 1980s was up to what point would a profit maximizing corporation invest to replace depreciated capital. It was postulated that a firm invests to the point where the incremental unit of capital provides, in present value terms, a stream of real returns that is just enough to cover all costs, including taxes, associated with that investment; or where the marginal benefit of

¹¹See Shome (1979).

¹²Having introduced above the concept of cascading in the context of consumption taxation, note that double taxation under the income tax could be thought of as a form of cascading.

¹³The imputation of a deductible interest charge to equity financing has been tried in, at most, a handful of countries, including Egypt. The corporate cash-flow tax, however, has not been tried.

a dollar's worth of capital per period is equal to the cost of holding a dollar of capital for that period. The cost associated with the holding of a dollar of capital per period is known as the cost of capital. This cost has two components: the cost of loan or equity financing and the cost of capital consumption reflecting depreciation. A capital income tax will affect both costs, possibly differently, affecting marginal investments. The marginal effective tax rate (METR) comprises the sum of the distortions created by the tax. The METR is also defined as the difference between the before-tax rate of return on a marginal investment and the after-tax rate of return on the savings that is used to finance that same marginal unit of investment. Many tax factors affect the METR. These include tax codes that affect the financing operations—debt versus equity—of a firm; whether tax deductions for depreciation compare with true economic depreciation; and the after-tax returns to individual savers who are the suppliers of loanable funds. Inflation is a nontax factor that undermines the ability of a firm to recover the real economic cost of using its capital, while the real value of debt will decline. Thus, without indexation, inflation can either increase or decrease the true economic cost of investment. The direction in which inflation will affect the METR is not possible to deduce theoretically, given the two opposite forces at work. Analyzing the determinants of the METR, Chua examines available empirical evidence suggesting that METRs tend to vary widely across capital assets and sectors reflecting, on the one hand, more favorable tax treatment for investment in agriculture, forestry, and fishery and, on the other hand, more generous depreciation allowances in services and manufacturing industries.

Many countries use or have used tax incentives of one form or another to stimulate investment—generated from within and augmented by foreign inflows—in preferred economic activities. Various types of tax incentives have been put in place including tax rate reductions for priority sectors, tax holidays for a certain number of years, and allowances with fast write-off of investment expenditure such as accelerated depreciation or investment tax credits that allow an investment expense to reduce tax liability. Nevertheless, empirical investigations in both developed and developing countries have overwhelmingly demonstrated that nontax factors such as economic and political stability supported by adequate infrastructure and a well-trained or trainable labor force, as well as the existence of natural resources, are likely to be more important in determining the level of investment. Among tax factors, the dependability regarding the continuation of a tax structure and a low overall level of taxation are more attractive to investment than differential tax incentives.

Additionally, tax incentives have efficiency costs since they distort the allocation of resources. They tend to erode the tax base, create an opportunity for "tax planning," and tend to benefit short-term investments and those that are already profitable. They also make monitoring and, therefore, tax administration more difficult. A common experience in developing countries that use tax incentives widely is that they become an instrument for tax avoidance and tax evasion as well as for corruption by the bureaucracy. Chua critically examines the role of tax incentives and their costs and describes the experience of Canada with tax incentives in a representative case in the province of Nova Scotia.

Cash-Flow Tax

Some economists have criticized the corporate income tax arguing that for all its complexity in design, in practice, it is not a tax on income at all but rather on some base residual of various ad hoc exemptions and deductions. They have recommended a simpler tax base to be defined as the cash flow of businesses. Three variants of the corporate cash-flow tax (CCFT) are as follows: The first variant is the R—or real—base CCFT in which the tax base is net real transactions (the difference between sales and purchases of real goods and services). As opposed to a corporate income tax (CIT), the RCCFT allows immediate expensing of capital outlays but not the deduction of interest payments. Interest received is not taxable. The second variant is the RF—or real plus financial—base CCFT, and in addition, includes in its tax base nonequity financial transactions (the difference between borrowing and lending). Interest and retirement of debt are deductible, while borrowing and interest received are taxable. The third variant is the S—or shareholder—base CCFT, which taxes the net flow from the corporation to shareholders (dividends paid plus purchases of shares minus issues of new shares) and conforms closely to the interpretation that the CCFT is a "silent partnership" of the government in any investment.

The CCFT's advantages lie primarily in the theoretical clarity of the tax base insofar as it does away with the problems of defining true economic depreciation, measuring capital gains, costing inventories, and accounting for inflation (although not in all variants of the tax). The CCFT, however, can give rise to problems—for example, tax-base erosion through avoidance and evasion. This could be contained by carefully designing the tax code and by selecting an RF-base over the R-base CCFT, thereby including the financial sector. On the other hand, an important advantage of the R-base CCFT—nondeductibility of interest, which eliminates incentives for debt over equity financing

and obviates any need for inflation adjustments for the calculation of real interest—is not shared by the RF-base variant. The S-base CCFT, while sometimes favored because it has been perceived to be administratively simpler, could lead to a tax rate of over 100 percent because of the definition of the S base. Thus, the choice among variants of the CCFT is not at all clear. In addition, international considerations turn out to be extremely important in any future implementation of the CCFT because of the unresolved treatment of foreign tax credits under a CCFT. The CCFT remains a theoretically attractive option with accompanying practical difficulties. The CCFT may prove particularly difficult to implement for a single—especially developing—country in an environment that may not necessarily accommodate its smooth and effective operation. Shome and Schutte examine theoretical aspects as well as the practical ramifications of the CCFT.

Payroll Taxes

An income tax that has become an important revenue source in both developed and developing country tax structures is one that is levied on payrolls. Payroll taxes are generally applied as a flat percentage of an employee's gross wages up to a limit. They are the principal means of supporting social insurance programs including social security, health insurance, unemployment insurance, and disability insurance programs. Payroll taxes are unusual in that their revenues are generally earmarked for specific purposes. While earmarking introduces rigidities into the budget by requiring revenues to be spent regardless of need, taxpayers may be more willing to pay a tax when they see a tangible return from the payment. In any event, the nature of expenditures that payroll taxes finance is found to be sufficiently socially important to safeguard it through earmarking.

Social insurance systems are financed either on a pay-as-you-go or funded basis. Under the former, the taxes that current workers pay cover expenditures for current beneficiaries. In contrast, the latter accumulates the taxes paid by individual taxpayers in a reserve fund to cover their future benefits. In recent years, social insurance programs based on the pay-as-you-go principle have faced the problem of rapid growth in current and future liabilities as a result of aging populations or expansion of benefits or both. At the same time, a reduction in the productivity growth rate has often led to a stagnating tax base. As a result, there has been some tendency to move toward funded systems. In terms of their design, payroll taxes typically adhere to simple structures, with no exemptions from gross wages, single, though different, rates for employee or employer

contributions, and mostly ad valorem rates. Different rates are typically used for different program categories, however. While both employers and employees must make statutory payments, the burden of the payroll tax is likely to fall on the labor market since wages are likely to ultimately reflect labor productivity which is not altered by the payroll tax. Assuming that the incidence of the tax is on the employees, the tax is regressive. This may lead to important ramifications for the composition of labor. Stotsky surveys various considerations under the payroll tax and practices in selected developed and developing countries.

Taxes on Assets, Property, Inheritance, and Gifts

In many countries, business assets or receipts are taxed, sometimes as a supplement, replacement, or minimum contribution to the income tax. A low tax rate is applied to a typically large base. Even with reasonable capital mobility, it is generally found that the average return on capital is dissimilar across industries. Thus, a tax based on an average rate of return on business assets is likely to be an imperfect proxy for the income tax. An assets tax is therefore better used as a supplemental or minimum tax. Many Latin American countries levy assets taxes using a variety of bases such as gross assets, net worth, fixed assets, and others. The gross assets tax emerges as the best tax, given theoretical and practical considerations. A gross—rather than net—assets base is appropriate if the objective is not to favor debt financed assets. A fixed assets base is simpler but tends to discourage investment in fixed assets as opposed to other asset forms. Under a gross assets tax, the incentive to choose output and input prices strategically is diminished, thus minimizing transfer pricing issues. A gross receipts tax base may include only product sales or also asset and equity sales, as well as receipts from issuance of new debt. Nevertheless, a gross assets tax also needs to be designed carefully. Valuation becomes complex, as the base includes varying proportions of long-term and current assets requiring average asset values to be determined for tax purposes, and as the impact of inflation becomes difficult to track during the life of a long-term asset. The timing of valuation is also important since a business's asset holdings fluctuate over the year. Other design issues can be quite important, including double taxation when taxable businesses own financial interests in one another. Also, the design of a gross assets tax must neutralize liquidity constraints that might otherwise arise from complying with tax liability. Krellove and Stotsky examine the pros and cons of the various taxes in this category.

Taxes on land and property are among the oldest forms of taxation. They have been justified on grounds of both the benefit and the ability to pay principles since government provides benefits in the form of law and order enabling the maintenance of property rights, while the ownership of property indicates ability to pay. Forms of property taxation include taxes based on rental value, capital value, or land value. But there are many practical problems associated with the tax. First, property is a heterogeneous good. Second, an accurate assessment of "fair market rental" or "fair market value" is often difficult, since they have to be based on elusive concepts such as income generation capacity or, if owner occupied, on comparable property value. Third, sometimes assessments are set low for social considerations. Fourth, while a flat tax rate would be better in terms of tax compliance and is easier to administer, the continuance of low assessments often results in high, progressive and, in turn, unimplementable tax rates. With respect to agricultural land taxation, while it may have comprised the oldest property tax, its importance has declined in terms of revenue even though some countries maintain records on them. An important reason is that taxes that have been applied, such as those based on land area, may not reflect land value and are inelastic in inflationary times. Thus, one of the major reform areas remaining to be implemented is agricultural—income and property—taxation. Stotsky and Yücelik examine various aspects of land and property taxes.

Another vintage tax is that on property transferred at death, reflecting a social as well as an economic philosophy. The objectives of the tax include limiting one's right to dispose of one's wealth at death or to acquire wealth through bequests without "own effort," establishing a final point to capture lifetime capital income while reducing disincentives for saving and investment, and redistributing wealth. However, these and gift taxes typically generate little revenue. Their bases are often eroded by large exemptions and undervaluations. Tax avoidance is practiced by "generation skipping" whereby a bequest is left to grandchildren to minimize the number of times an estate changes hands. While rates are progressive, usually with three or four rates as evidenced in a large number of countries, they tend to lead to parcelization of estates. Valuation problems relate mainly to the heterogeneity of properties such as life interests, annuities, personal effects, and businesses and shares for which cadastral values may not be used. Another issue is the timing of valuation, which has to be determined as the fair market value at the date of transfer or the date of death. Yücelik examines these and related issues pertaining to the taxation of bequests, inheritance, and gifts.

Taxation and the Open Economy

The traditional concerns pertain to the design and effects of international trade taxes. As links through international trade and finance have made the world more economically integrated, however, so have the complexities in the method of taxation, for example, whether to be based in the country where the "source" of income lies or where taxpayers are "resident." Chapter V focuses on various aspects of taxation in the context of an open economy.

Free Trade, Protectionism, and Nominal and Effective Protection

The case for free trade goes back to Adam Smith and David Ricardo. It is "static" in nature. The idea is based on the "comparative advantage" of trading partners in their production activities, transforming exports into imports according to their international relative prices. Also, international trade expands the set of goods and services that consumers can afford by reducing their prices or by making new commodities available. A country will achieve a higher welfare with free trade than with protection, which distorts prices and restricts market exchange. Recent theory postulates that "dynamic" economic growth is the result of various factors including human capital accumulation, investment in research and development, and that open trade policies allow a country to profit from growth-enhancing factors. Closer economic links increase the transmission of new technologies. For example, imports of intermediate products may embody technology developed abroad. Greater competition leads to greater assimilation of new technologies, improved products, and a wider diversification of output. Protectionist policies have the opposite effects.

Arguments in favor of protectionism assume that governments can "pick winners" or "infant industries" to determine which industries to support. In practice, however, trade policies tend to be influenced by special interest groups, hampering the selection of both winners and infant industries. Beneficiaries of protectionist trade policies devote considerable resources to "rent-seeking" activities aimed to maintain and extend existing protection, further magnifying distortions and inefficiencies in resource allocation. The rationale for tariffs, therefore, has to emerge from elsewhere.

Unlike nontariff barriers—quotas, voluntary export restraints, and subsidies—trade taxes yield revenue, sometimes constituting its main and most stable source. Notwithstanding, import and export tariffs are not optimal instruments to raise revenue. A combina-

tion of domestic taxes levied equally on domestic and imported products along with revenue neutrality with respect to tariffs will cause a lower efficiency loss. The inward-oriented bias caused by tariffs can produce large inefficiencies and hamper growth. Domestic taxation of consumption or income can meet the revenue target with lower rates, broader bases, and without a protectionist bias. If domestic tax sources are not easily available, as in rudimentary economies, tariffs are the available option. An argument in favor of tariffs is their lower administrative cost. Countries with weak tax administrations and a lack of accounting sophistication on the part of taxpayers tend to rely on them. Sometimes tariffs or across-the-board import surcharges are applied to contain an imbalance in the external sector and thereby temporarily avoid necessary domestic adjustment. Countries that favor exemptions within the general structure of tariffs may include a minimum tariff to capture all potential contributors. In an increasingly complex trading environment, some countries resort to tariffs as an "antidumping" measure.

In principle, a tariff may be beneficial for a country that can affect the international price of its imports or exports. For example, an import tariff can result in an optimal pricing strategy when the country has a monopsony in import markets. The "optimal tariff" is determined in this context by setting the benefits—government revenue and private profits—against the costs—domestic distortions and misallocation of resources. Similarly, those countries that have an oligopoly in a natural resource can improve their terms of trade by restricting or taxing exports. The rest of the world, however, would be worse off. Small trading economies, such as most developing countries, however, cannot expect to improve their own welfare through optimum tariff policies. Further, a "new trade theory" postulates that economies of scale and externalities cause decreasing average costs and thus, larger producers tend to have an advantage over smaller ones. Producers that gain initial control of a large share of the market are able to drive competitors out. This in turn results in retaliatory tariffs. The design of strategic trade policies, however, requires extensive knowledge of many details of world markets that are often unavailable to small trading economies.

How much protection is obtained for an importable item by imposing an import tariff cannot be gauged directly from the statutory tax structure. "Effective protection" may be quite different from "nominal protection." A tariff on an import raises its domestic price and shelters it from international competition. The amount of protection is usually expressed as a percentage of the international price. If the tariff is an

ad valorem tax proportional to the value of imports, the tariff rate measures the nominal rate of protection. If the tariff is specific, the nominal rate of protection is given by the tariff divided by the price net of the tariff. The nominal rate of protection, however, is not always a good indicator of true protection since it only looks at output price. If a tariff applies to intermediate goods, it will increase domestic input prices, thereby bringing down the true or effective protection enjoyed by the domestic producer. It therefore depends on the magnitude of the value added. Indeed, the effective rate of protection can be defined as the amount by which the value added in a sector at domestic prices exceeds the value added in the sector at international prices expressed as a percentage of the latter. Effective and nominal rates of protection for a sector may diverge widely. Neutrality of a trade regime implies equal rates of protection across industries of tradable goods, both exports and imports. Even high tariffs could be devised to maintain neutrality even though they would be very distortive. Thus, neutrality of a trade regime is not an indicator of the efficiency loss from protectionist policies. Escolano examines these conceptual issues in some detail.

Tariff Reform: Import and Export Duties

In recent years, policy advice on trade reform, notably in IMF- and World Bank-supported adjustment programs, has emphasized the need to lower average tariffs and to curtail the dispersion of existing rates. Reform aims at a low, uniform tariff and at the removal of nontariff barriers. The rationale is not purely theoretical; rather, it is based on a wide scope of considerations ranging from revenue and administration costs to the suboptimality of protectionism. The case for a low tariff rests also on its small economic cost which is the value of the output forgone due to losses in economic efficiency. Minimizing the dispersion of rates is also based on several grounds. Multiple rates substantially increase the cost of administering the tariff. A uniform rate implies uniform effective protection of all domestic industries. Rate dispersion encourages special interest groups to devote resources to increase the amount of protection granted to them. Distortions prompted by a tariff grow more than proportionately with the tax rate.

Nevertheless, the literature on optimal taxation lends favor to greater dispersion of rates. One result of this theory is that final goods should be taxed at higher rates than inputs. This is because tax-induced changes in the relative prices of inputs can lead to the choice of inefficient technologies since some inefficient technologies may become more profitable to the extent of

overtaking efficient technologies. Extending that argument, the theory of optimal taxation recommends higher tariff rates on final consumption goods than on intermediate products. Among final goods, those with a more inelastic demand should have higher rates. The theory of optimal taxation, however, has found little application in practice because of the vast amount of information required to construct an optimal tariff structure. Independent of the directives of optimal taxation theory, in many cases, policymaking needs to operate within the parameters of a given level of protection. The optimal tariff structure under that constraint will depend on the reasons for protection. For instance, if the objective is to redirect resources from industry to agriculture, a uniform tariff will not help achieve that goal. As mentioned previously, however, a case for a single rate tariff structure might still be made on efficiency, administrative, or political grounds.

Despite the success of outward-oriented trade strategies, many developing countries maintain high levels of protection. Often the objective of import substituting policies has been to protect domestic producers of final consumption goods through high tariffs or quantitative restrictions. Protectionist policies have also led to an antiexport bias. Since most developing countries are small traders and cannot expect to increase the international prices of their exports, high cost and limited availability of inputs result in a negative effective protection rate for those industries that employ importables to produce exportables. In contrast, many of the world's manufactured exports come from places where exporters face relatively low trade barriers with regard to the taxation and availability of inputs. One way in which some successful exporting countries have provided exporters with inputs at world prices has been by applying a policy of zero tariffs on all inputs. Other methods that have been practiced to insulate exporters from taxation are duty drawbacks that allow a rebate to exporters on all duties and indirect taxes paid, duty waivers and exemptions from nontariff barriers, and the installation of bonded factories and duty-free export processing zones, which are essentially islands of production solely for export. Little analytical work exists on methods of isolating exporters from inward biases created by protectionist policies.

Export duties have played an important role in the tax structures of many developing countries. In 1980, 67 countries imposed export duties, mostly on one or two commodities that accounted for a large share of the traditional exports of the country. They have been defended on various grounds: they improve terms of trade, substitute for income taxation, stabilize export revenue and tax away windfall gains. Empirical studies,

however, show that exports have been overtaxed, leading to excessive reduction in supply and loss in foreign currency earnings. They have also in general failed to stabilize producers' incomes. In the 1980s and 1990s, many developing countries dismantled them. Sometimes the export sector has either been taxed implicitly through foreign exchange surrender requirements at artificial exchange rates, or it has had to contribute to export stabilization funds or face prices designated by state marketing boards. These have occurred to stabilize domestic prices and incomes rather than to generate revenue. In practice, however, accumulated fund surpluses have often not been sufficient or have not been used to compensate for losses incurred in other periods. The operations of state marketing boards tend to become complicated and fall captive to special interest groups. Escolano examines matters pertaining to import and export tariff reform in some detail.

Source and Residence Principles, Tax Treaties, and Tax Harmonization

Taxation of productive factors in an economy—whether directly or indirectly—involves balancing national against international considerations. While national objectives are concerned with revenue, allocative efficiency, and equity effects of taxation, such tax systems may have fundamental ramifications on the volume and allocation of productive resources internationally. This is because factor returns and the underlying tax bases straddle national boundaries. To deal with possible conflicts, adjustments to domestic taxation are needed. One set relating to direct taxation is represented by the residence and source principles. The analogous set for consumption taxes such as the VAT is the origin and destination principles.

For income taxation, the residence principle asserts that individuals are taxable in the country or tax jurisdiction in which they establish residence regardless of the source of income. For legal entities, establishing residence is less clear cut, though it is increasingly tied to the location where its business activities are registered. The source principle asserts the prior, and even sole, claim of the country in which the income arises to natural or legal persons, to tax such income without reference to other criteria. In practice, countries have tended not to stay with the pure application of a single principle but to apply a mix—residence for nationals residing in the country, and source for income earned within the country by nonresidents or nonnatural persons or both. The nature of mixes has depended on a country's objectives regarding foreign investment, revenue, administrative capabilities, and degree of cooperation with competing jurisdictions. Since the various

mixes are not uniform, double taxation might result, leading to the need for tax treaties.

For consumption taxation, for example, the VAT, when exports are zero-rated and imports are taxed, a destination-based VAT results. Most countries apply the destination principle, although within multicountry trading blocs, such as the European Union, the elimination of national boundaries would result in the use of the origin or source principle. This needs to be supplemented by clearing-house arrangements to compensate for revenue gains or losses.

The inherent conflict between the residence and source principles is often resolved through tax treaties initially contracted on a bilateral basis between developed countries with a rough balance in the exchange of income flows. Over time, however, the treaties have diverged on concepts, structure, and operating rules. Nevertheless, they cover complex and conflicting concerns of the contracting parties about sharing income taxing jurisdictions. They address concepts and definitions for tax purposes of a permanent business establishment, tax treatment of dividends, interest, royalties, and capital gains as well as arrangements such as "tax sparing," which allows any tax benefit accruing to a business in a capital importing source country to be spared from being recouped in a capital exporting residence country. Tax treaties also contain provisions for the exchange of information with tax implications between national tax jurisdictions.

If taxes across international borders were fully "harmonized," there would be little need for tax treaties. At another level, however, tax competition through market pressure may be desirable because it would exert a downward pressure on taxes, on public expenditure, and on greater efficiency in the allocation and use of world public resources. But tax competition has destabilizing short-term macroeconomic spillover effects which could interfere with the efficient functioning of global trade and capital markets. Thus, tax harmonization does play a salutary role in supporting interjurisdictional equity, locational neutrality, and taxpayer equity. In this chapter, Faria focuses on an analysis of the various principles, considerations in the design and content of tax treaties and tax harmonization, as well as a brief look at their development.

A major problem for tax authorities has been to monitor how and to what extent multinational enterprises allocate their global income among fiscal jurisdictions in order to minimize their overall tax liability. In the literature, this issue is referred to as "transfer pricing," where transfer price is the price for the internal sale of a good or service in intrafirm trade, that is,

among affiliates in different countries. Transfer price manipulation has increased in importance as intrafirm trade has multiplied over the last two decades. For example, in 1989, 86 percent of U.S. parent company imports were from foreign affiliates and 89 percent of U.S. parent company exports were destined for foreign affiliates. National tax authorities are faced with the task of establishing and enforcing rules for the setting of such prices while minimizing conflicts with other jurisdictions. Fortunately, a consensus has developed that a single guideline should be adhered to, generally known as the "arm's-length" criterion, which stipulates the price that would have been negotiated if the parties were unrelated. The OECD, for example, has developed several guidelines for determining arm's-length price, based on a known comparable uncontrolled price or a price at which a multinational sells to an unrelated party. Nevertheless, developing country tax authorities in particular continue to be ill-equipped to cope with transfer-pricing issues. McCarten investigates these matters, together with experiences of developed and developing countries.

Relatedly, the tax treatment of branches and subsidiaries of multinationals has many facets.¹⁴ In general, attributable profits for tax purposes must adhere to arm's-length conditions. But there are specific advantages and disadvantages of operating as a branch or subsidiary. For example, a corporation can usually deduct fully the losses incurred abroad by a branch against its home country tax liability. Further, a branch can repatriate after-tax profits to the parent company without further taxation, such as a withholding tax. Usually, parent companies can transfer property to a branch without incurring taxation in the home country. Tax incentives are often carried over to a branch but not to a subsidiary. There are also many disadvantages of a branch operation. For example, a parent company cannot defer home country taxation on branch income that is not remitted to the home country. Host countries typically grant more generous tax options to subsidiaries than to branches, such as for loss carried forward or backward, or deductions, to limit transfer pricing abuses. McCarten examines these and related issues in this chapter.

Selected Issues in Taxation

Particular issues in tax policy exist that cannot be clearly categorized under the above sections. In other

¹⁴A foreign enterprise that operates in a host country but does not incorporate is a "branch." A "subsidiary" operates under incorporation. Both forms may set up a "permanent establishment" of operation and thus come within the purview of taxation of the host country.

cases, even though it would not be impossible to consider them as a part of those topics, they are unique enough to be best considered independently. These special issues are grouped together in Chapter VI.

Taxation of Mineral Resources

The taxation of petroleum resources deserves special consideration. One way of considering the issue is to treat it as a tax on the return on capital assets such as mineral resources. Government is cast to have a dual role: it is a sovereign taxing power as well as a resource owner. As the sovereign tax authority, it will impose the same tax arrangements that apply to economic activities in general. As the resource owner, it will seek a return on its resource assets. It can use various tax instruments such as income tax, royalties, resource rent tax, and others. Questions often arise as to the appropriate tax instruments under those circumstances. The taxation of mineral and petroleum resources, especially as they have arisen in practical queries and design of tax systems, is the subject of Nelor's examination in this chapter.

Taxation of the Financial Sector

The financial system that directs capital to its various uses is critical to a modern economic system. It includes commercial and savings banks, credit unions, insurance companies, pension funds, brokerages, and other institutions. In some developing countries, the informal financial sector comprising money lenders, cooperative and trade credit, pawnshops, and various funds, may be more important. The financial sector increasingly provides a variety of services, acting as intermediary between borrower and lender, offering insurance against risk, financial management services, and consulting. The taxation of this sector—in the form of income or consumption taxation—demands separate consideration.

In the case of income taxation, the measurement of income of financial institutions relates to the timing of income. They provide services that have an explicit time dimension. The possibility of future receipts or payments is a part of their business activities. A corporate income tax typically applies to business income as it accrues. Yet banks have to set aside funds for bad loans and insurance companies for future payments on policies. Governments often require them to set aside minimum funds which may not necessarily match, and will probably fall below, their actual payment needs. Thus, the extent of tax deductibility becomes an issue. Another problem arises from the intertwined nature of investment and other services

provided by financial institutions. Taxpayers typically owe tax on investment income net of costs while costs of services not related to investment income are not deductible. To the extent that financial institutions are not able to separate the two cost components, there may be an understatement of taxable income. Another problem relates to the separation of return *on* capital from return *of* capital. Essentially, the fact that a deposit represents liability and not income needs to be recognized in the calculation of taxable income. An insurance company's income is derived from premium payments and investment income. Premium payments may represent both a payment for services and a "deposit" for investment. Only the former should comprise income since the other component must be returned. In practice, it may be difficult to separate the two. In the case of banks, however, deposits can be identified more clearly.

In the case of consumption taxation, for example the VAT, its base should include financial services in principle. It is possible, in general, to measure value added by adding profits, wages, rent, and interest or, alternatively, by taking the difference between investment income and the cost of funds. The use of invoices under the VAT requires that VAT liability be attributed to each transaction. This is not possible for the banking sector, however, since financial services provided by banks do not have specific charges attached to them. Charges result from differences in interest rates charged and paid. In the insurance sector, value added in noninvestment insurance is measured by the "loading charge"—earnings of the insurer over and above payments of claims. Value added is not properly measured by the value of premiums or claims since this includes the component of premiums that is a redistribution from one policy holder to another. Again, value added has to be measured as the loading charge, eliminating the savings component. It is, therefore, not easy to tax financial institutions under the VAT. They are, therefore, often exempted. For example, OECD countries exempt their intermediary functions while taxing selected activities such as check printing, safe deposit rental, and foreign exchange transactions. Israel is one country to have attempted to apply a comprehensive base deriving it by adding different value added components. Stotsky examines various issues pertaining to the taxation of the financial sector.

Fiscal Federalism and Tax Assignment

Governments comprise many levels. Different taxes are assigned to different levels. Revenue from the same tax is also shared across levels. Many questions arise as

to their best division. While valuable literature has developed over the years on these issues, only recently are their ramifications on macroeconomic stabilization being questioned. The rationalization for decentralization of fiscal responsibility to various levels of government rests on the potential efficiency gain which follows from the possible differentiation of the provision of public goods and services in different locations in accordance with the tastes of the local population. From this starting point, governmental functions are assigned to various levels. The consensus that has emerged is that distributional policies should be assigned to the central government since otherwise, people bearing the burden of those policies would migrate. Likewise, local stabilization policies will be inefficient because of spillover effects. Thus, the core function of local governments should be allocation. The financing of lower levels of government may come from user charges, taxes, central government grants, and borrowing. Of these, user charges seem to be the most practical and commonly used. The ability to borrow relatively freely has led to impediments in fiscal stabilization and to limits on this power. The assignment of taxes to lower levels of government has not necessarily led to their determined effort to generate revenue, particularly in developing countries. Thus, grants and revenue sharing from central government taxes have played an important role in financing lower level governments.

A good local tax is one whose burden cannot be exported by the local jurisdiction elsewhere. Though some experts recommend local income taxes, land and property taxes seem to satisfy the criterion best. However, "piggyback" local taxes on a central income tax could be devised. On the question of designing the tax, while tax rates can be left to local taxing powers, the tax base should be determined at the central level since determining the base involves distributional considerations and consequences and differences in base across localities would reduce transparency and accountability. Apart from tax assignment, governments may use revenue sharing and grants to achieve particular objectives, such as income redistribution across regions, to overcome insufficient local revenue generation capacity and to induce local governments to expand particular services. The objective, however, should be to equalize, across localities, the ratio of tax revenue to services provided. Thus, unless grants clearly correct for externalities, their amounts should be minimized. Nevertheless, actual country policies vary considerably in terms of the equalization criterion. Norregaard considers in a nutshell various issues pertaining to fiscal federalism, focusing on the revenue side.

Revenue Forecasting and Estimating

Revenue estimating is the process of assessing the impact on revenues of tax law changes proposed at the time the budget is presented. On the other hand, revenue forecasting takes place even when no change in the law is proposed, just for the regular budgetary process. A number of different methodologies are employed for revenue forecasting. First, one method of making an unconditional forecast is to extrapolate an established linear trend in receipts from a particular tax. Alternatively, to make a revenue forecast when a GDP forecast is available, an estimate of the elasticity of tax revenue with respect to GDP may be employed. Of course, the elasticity itself will have to be re-estimated from time to time since the procedure assumes that elasticity values are constant. This is done by removing from the time series on tax revenue the effects of any changes to the tax law that may have been made during the period. Particular procedures have been developed for this purpose under different assumptions regarding tax revenue behavior over time resulting from a tax law change. Second, dummy variables may be used to capture the revenue effect of a tax law change. Third, more complex macroeconomic models are also used for revenue forecasting. Generally, regression methods are used to estimate functional relationships between revenues from particular taxes and a variety of macroeconomic variables. The relationships need not be constrained to imply constant elasticities. An advantage of this procedure is that revenue forecasts are integrated with the corresponding macroeconomic forecasts. Fourth, structural "microsimulation" models of major taxes have also been developed based on tax return data. Many OECD countries use this method. They apply the tax law to the structure of the tax base at the level of individual taxpayer liabilities. This method, however, suffers from a potential inconsistency between macroeconomic forecasts and revenue forecasts.

Revenue estimating is the assessment of how possible changes to the tax law will affect tax revenue. Several factors need to be accounted for to obtain the right revenue estimate. First, the effect will vary over time. Second, collection lags will affect revenue. Third, some changes will only have temporary revenue effects. Fourth, change in one tax law may affect revenues from other taxes. It is harder to generalize about revenue estimating methods than revenue forecasting methods since the tax law changes are varied. For example, changes to the rate of a proportional tax, say on consumption or wage income, may be straightforward to deal with, while changes to an existing tax allowance in a progressive income tax may be more difficult.

Originally, microsimulation models were developed to tackle these types of issues. But even these models may not suffice in revenue estimating. For example, estimating the revenue impact of extending the personal income tax to cover social security benefits may not be feasible from a sample of tax returns since the latter would not contain information on currently exempt income. Thus, revenue estimating remains relatively complex. King focuses on the different procedures and methodologies of revenue forecasting and revenue estimating as well as their pros and cons.

Presumptive Taxation

Many developing countries use presumptive methods of taxation to counter deficiencies in tax administration. Often they are used to tax small businesses, which may represent the majority of enterprises. But they may apply to entire classes of taxpayers or only to taxpayers who fail to file a standard tax declaration. If used judiciously, presumptive taxation may broaden the tax base by increasing the number of taxpayers and their tax payments. Even if the revenue per taxpayer is low, it may have spillover benefits in facilitating the movement of small taxpayers from the informal to the formal sector and as a source of information to combat evasion. Presumptive methods may help reduce audit time and cost. Since they generally comprise a tax on average or "normal" income, the marginal tax rate on income above this average income is zero. Therefore, they avoid the negative incentives associated with high marginal tax rates. Nevertheless, they carry the danger of harassment and extortion of taxpayers by unscrupulous tax officials. The use of punitive presumptive tax rates to push small taxpayers into self assessment may backfire by causing taxpayers to go underground.

There are several different ways to levy a presumptive tax. Estimated income, assets, turnover, or external indicators of income are all alternatives. The level of economic sophistication influences the choice of presumptive tax methods. A simple approach is to levy a lump sum on all businesses. A more sophisticated approach involves a census of taxpayers and a determination of average profit margins, using objective factors differentiated by activity, based on which presumptive schemes may be developed. Nevertheless, the detailed approach has been criticized because using precise factors to determine income may transform the tax into a tax on that factor rather than approximating a general tax on income. Assessment may be either on an individual or a collective basis. Under the latter, individual taxpayers cannot contest the levy, and tax administration is simplified. Under the former, taxpayers may be required to submit certain annual information so that the admin-

istration can assess their net income by applying cost-profit ratios. At the same time, the taxpayer can negotiate tax liability and appeal through the judicial system. Bulutoglu analyzes the many properties of presumptive taxation including a shortcut to auditing, the use of income indicators, the pros and cons of individual versus collective assessment, and their incentive effects.

Minimum Taxes

Another method for generating revenue when tax administrations are not perfect is to require taxpayers to make minimum contributions to selected taxes. By virtue of their uses, presumptive taxes overlap with minimum taxes, but this may not always be the case. Similar is the comparison between assets taxes and minimum taxes since increasingly assets-based taxes are being used as minimum contributions toward business income taxes. The purpose of a minimum tax is to ensure that businesses or individuals with economic income do not regularly avoid paying tax on it. The United States, Canada, Denmark, and Norway have a minimum income tax based on a broader concept of income (with less deductions). Among Latin American countries, Argentina, Ecuador, Mexico, and Peru have minimum business income taxes based on gross assets.¹⁵ Several other countries are considering minimum income taxation. A business minimum tax may reduce the inequity of the business income tax which may arise because of differences in tax compliance across businesses. Also, as tax preferences such as deferrals and exclusions proliferate, the resultant narrowing of tax bases is partially restored by minimum taxes. In an inflationary environment, the gain made by debt-financed firms in reducing tax liability is also checked. A business minimum tax has also been justified as a business license tax. Nevertheless, the two are different in that a business minimum tax is always creditable against the regular income tax, but a minimum license tax is not.

There are various forms of a business minimum tax. In a simple form, it may comprise a requirement for each taxpayer to pay fixed nominal amounts. This would function as a lump-sum tax and hence would be efficient. But it would be inequitable since it would not be a proxy for an income tax. Using turnover as the base provides certain advantages since turnover is the most easily measured financial variable for a business and most easily available to tax authorities. An assets-based minimum tax has a theoretical appeal in that economic income could be expected to bear a systematic relationship to assets. It has to be designed care-

¹⁵Argentina has just repealed it.

fully. Its base is gross business assets including cash and securities, receivables, inventories, land and other fixed assets at depreciated value, and intangible assets at amortized value. Alternatively, it is also possible to impose the tax on fixed assets—land, plant, and equipment—but this discriminates against particular asset forms, or on net assets—gross assets net of debt-financed liabilities—but this does not remove the incentive to reduce the tax base through increased borrowing. Mexico's minimum assets tax has a rate of 2 percent based on gross assets. The assets tax liability is designed to be roughly equal to a taxpayer's income tax liability. If the taxpayer is assumed to earn a 6 percent return on assets and the business income tax rate is 35 percent, then a 2 percent tax on assets is roughly equivalent. Taxpayers can credit their income tax liability against their assets tax liability. Another alternative is to levy the tax on some redefined notion of business income, as in the U.S. corporate alternative minimum tax, which is computed by making certain adjustments and adding certain tax preference items to income. Businesses are required to compute taxable liabilities under the regular and alternative systems and pay the higher of the two. Stotsky analyzes aspects that must be kept in mind in designing minimum taxes for both businesses and individuals, such as appropriate bases and rate structures.

Tax Policy and Tax Administration

Tax policy and tax administration are inextricably related. The government's role requires that it be able to finance its activities in a noninflationary way through compulsory extraction of resources from households while minimizing distortions. Herein lies the primacy of tax policy in helping to attain economic policy objectives. Tax administration must therefore evolve an internal dynamic to promote the effective application of tax policy.

In nascent economies, tax administration may have to focus on large taxpayers, while rudimentary presumptive methods may have to be used for contributions from smaller taxpayers. As economies mature, however, consideration should be given to the extent to which the administered tax system resembles the legislated tax structure. If, to simplify tax administration, potential taxpayers have had to be ignored or actually left out of the functioning ambit of a tax such as the VAT or income tax, consideration must be given to the extent to which the universe of taxpayers can be increased over time to include more of the "minor" taxpayers. Relatedly, while the role of "large" taxpayer units in improving auditing and revenue performance should not

be minimized, the rate at which the coverage of these units can be expanded—if not merged with the general taxpayer population—should be considered an important criterion for measuring the maturity of a tax system. Faria and Yücelik consider the interrelationships between tax policy and tax administration.

Tax Reform Experience and IMF Tax Policy Advice

Policymakers often ask for the nature of cross-country experiences in tax reform, and to view the extent of common trends and divergences. Especially as the transition economies of Eastern Europe and the former Soviet Union undertake reform, it is interesting to compare their experiences with tax reform patterns in market economies. In this light, it is also interesting to examine the content of IMF tax policy advice. These comprise the focus of Chapter VII. This chapter is supported by an appendix containing selected tables on tax revenue data (1975–92), their relation to GDP, and their shares in total tax revenue across different country groups.

Recent Tax Reform Experiences

In market economies, recent tax reform experiences form certain patterns. Their patterns change with time; for example, the 1960s and 1970s were quite different from the 1980s. The patterns also differ according to geographical area; for example, trends of Latin America may be distinguished from those of Europe and Asia. In the 1990s, the concerns in carrying out tax reform in ex-Socialist or transition economies are again quite different. Overall, among market economies, it can be said that the VAT is now universally accepted as an economically efficient and administrable tax. The bases have been broadened and there is a recognition that few rates are better. As dependence on the tax has grown, however, so have the rates. The number of selected excises has diminished, the main ones being on tobacco, alcoholic beverages, and petroleum products, even though other excises continue, especially with tariff reform. Customs tariffs have been scaled down and export duties have mostly been eliminated. Income tax rates and rate dispersion have decreased. Top marginal rates apply at lower levels in terms of per capita GDP. Rates of taxation affecting international flow of capital have also come down. While there is a consensus that the income tax base should be broadened and made more transparent, there has been less success in implementing this. Many developing countries are introducing presumptive taxes, minimum

contribution requirements, and withholding taxes to buttress tax administration.

Patterns are less easily identified among transition economies. Even as modern tax policy is taking form in those economies and, while recognizing that they may have come a long way from the system of transfers typical of a command economy, it would be pertinent to note that transition economy tax systems are rapidly acquiring complex, distortionary features. Many of the taxes conform neither to broad-based tax structure design nor to a simple—though distortionary—interim tax structure focused on closing the fiscal deficit. Needless to say, nascent tax administrations could hardly be expected to implement these tax structures efficiently. As a result, tax systems need much improvement.

To list the causes behind this situation, first, transition economies were operating their own complex tax/transfer mechanisms—reflecting social considerations as well as priority activities—before the period of change. Some of the current practices—even though modified—reflect old centralized operations in favor of intervention and differentiation. Effort has to be made to steadily reduce such methods. Second, many transition economies continue to cast their tax policies in the model of (or as a reaction to) the Russian Federation. Third, transition economies are receiving technical assistance from diverse sources. Their tax policies reflect a mix of such advice. For example, European thinking on the VAT with the accommodation of multiple rates is different from that based on wider experience, inclusive of Latin America and Asia, which tends to indicate that multirated VATs are difficult to administer. Or, some experts may think that a modified cash-flow tax may be ideal in a fresh environment, while others may think that it may be quite complex as a starter (Tait, 1992). Fourth, experience in both Western and Eastern Europe reveals that tax reform is a complex process and may be expected to be the same in transition economies. Long preparation is needed for major tax reform even in industrial countries in terms of tax administrator and taxpayer education, as well as in terms of the fruition of the process—from tax policymaking, to giving it legal form, to putting it into action. In Eastern Europe, such as in the Czech Republic, tax packages have had to be withdrawn after they were announced and published, to be ratified later in a modified form, through a referendum.¹⁶ Similarly, in transition economies, already,

tax packages proposed by the government's executive branch—reflecting, for example, technical assistance recommendations of multilateral institutions—have not been accepted by the legislative branch. This simply implies that tax reform will be a slow process, as experienced in many countries in Latin America or East Asia, where fundamental tax reform is taking hold after decades of experimentation. Faria surveys the various experiences with tax reform.

IMF Tax Policy Advice

IMF tax policy advice has emphasized the need to enhance the neutrality of tax systems and, in line with international reform trends, to improve the administrability of the tax code. In general, Fiscal Affairs Department missions have recommended two courses of action: (1) to simplify the structures of existing taxes (by reducing the number of rates, broadening the bases, and eliminating preferential treatment of particular economic agents or activities); and (2) to introduce new and simple taxes (such as a single-rate VAT) to replace old and complicated ones (such as a multi-rate turnover tax).

When countries have sought IMF advice for identifying policy options to mobilize additional budgetary resources, technical assistance missions have been uniformly guided by the principle of designing measures that would generate adequate revenue to meet the countries' budgetary needs in as economically neutral a manner as possible. As circumstances warrant, however, they have also suggested interim measures that deviate in varying degrees from the long-term goals of tax reform.

In general, IMF tax policy advice has had a discernible impact on the course of tax reform in many countries. By type of tax, reform recommendations on the domestic consumption and international trade taxes have met the greatest success in terms of the extent to which they have subsequently been implemented. By geographical location, technical assistance advice has had the greatest influence on Western Hemisphere economies and selected economies in transition. As expected, timely and concrete policy actions have materialized more frequently when technical assistance advice was given in the context of IMF-supported programs. But even when IMF resources were not involved, the missions' analytical work supporting their recommendations often provided significant assistance to authorities in their policy deliberations. Stotsky carries out a review of IMF tax policy advice.

¹⁶Also, see Gordon (1992) on Poland, and Kopits (1993) on Hungary.

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II

GENERAL CONCEPTS AND ISSUES

Taxation and Efficiency

HOWELL H. ZEE

- *How does taxation lead to a loss of efficiency?*
- *What are the alternative measures of tax-induced efficiency loss?*

The imposition of a tax, under most circumstances, has both efficiency and equity consequences. This section focuses on the concept and measurement of the former,¹ while those of the latter are discussed in the following section on taxation and equity. Examining these two consequences separately eases the analytical exposition of certain key concepts in the theory of optimal taxation. In reality, they are, of course, necessarily intertwined, and the choice of a particular tax policy frequently involves an implicit or explicit calculation of the trade-off between efficiency and equity concerns. This is most clearly brought out in the context of the theory of optimal income taxation, discussed in Chapter IV.

To abstract from equity considerations, the discussion in this section assumes the existence of a representative consumer, so that his individual welfare can be taken to represent social welfare as well.

Defining Efficiency Loss

A tax, except in the form of a lump-sum levy (see below), reduces the consumer's welfare in two ways: directly through a transfer of resources from him to the government, and indirectly through a rise in the consumer (i.e., tax-inclusive) prices of taxed commodities relative to those of nontaxed ones.² The former produces a (direct) income effect, while the latter gives rise to both an (indirect) income effect and a substitution effect in the standard manner following a relative price change. The efficiency loss of a tax refers to the excess of the reduction in the consumer's welfare above and beyond that which can be accounted for by income loss due to payment of the tax. For this reason, the efficiency loss is usually referred to as the *excess burden* of the tax.³ Note that this excess burden arises purely from

the tax-induced change, or distortion, in the relative prices of taxed and nontaxed commodities. Hence, a lump-sum tax, which by definition does not distort relative prices, cannot have any excess burden. It then follows that the excess burden of a tax can be alternatively stated as the additional welfare loss from the tax relative to a lump-sum tax of the same revenue yield.

Two important implications follow immediately from the above discussion. First, even if the consumer's demand for the taxed commodities is such that it is not affected by the tax-induced change in their consumer prices (i.e., the demand curves for the taxed commodities are vertical), the tax would still entail an efficiency loss because of the induced relative price change (see below). Second, if *all* commodities are taxable and are being taxed at the same rate, then no relative price change, and, therefore, no excess burden, can occur. The significance of this second implication for tax policy is elaborated in the section on optimal commodity taxation in Chapter III.

Measuring Efficiency Loss

How can the excess burden of a tax, defined above, be measured, that is, be expressed in some equivalent monetary units? For simplicity, the discussion in this section focuses on the case of a single taxed commodity. Complications arising from the taxation of multiple commodities are considered in the following section.

Dupuit-Marshall-Harberger measure

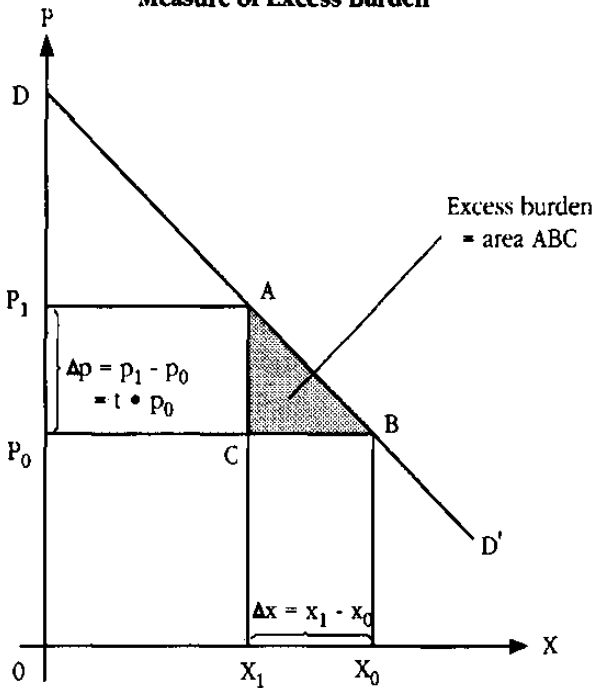
The Dupuit-Marshall-Harberger (henceforth DMH) measure of a tax's excess burden relies on the use of the concept of consumer surplus as a measure of the consumer's net welfare in consuming a commodity. In Figure II.1, DD' is the consumer's ordinary demand curve for commodity X , with X_0 being the quantity demanded at the initial price P_0 with no tax. The consumer surplus is then the familiar area below the demand curve but above the price line, that is, the area of the triangle DP_0B . Consider now a tax at the ad valorem rate t imposed on X , so that its consumer price rises to $P_t = (1 + t) \cdot P_0$, resulting in a decrease in the quantity of X demanded from X_0 to X_t . Compared with the pretax situation, consumer surplus has now declined by the area of the trapezoid P_tABP_0 . The area of the rectangle P_tACP_0 represents, however, the

¹See, among others, Auerbach (1985), Harberger (1978), and Mackenzie (1983) for general treatment of this subject.

²For simplicity, it will be assumed throughout the discussion that the producer (i.e., tax-exclusive) prices are constant and not affected by the tax. Implications from relaxing this assumption are discussed in the section on optimal commodity taxation in Chapter III.

³The excess burden of a tax is also commonly known as the deadweight loss of the tax.

Figure II. 1. The Dupuit-Marshall-Harberger Measure of Excess Burden



total tax payment. Hence, the excess burden of the tax is the area of the triangle ABC , which measures the excess of the reduction in consumer surplus above and beyond that due to the tax payment.

The area of the triangle ABC can be calculated in a straightforward manner, since it is given by one half of its base multiplied by its height. Let the symbol Δ denote a change in a variable. Then the base of the triangle ABC is $-\Delta X$ (note that the term ΔX itself is negative, since the quantity of X demanded has fallen because of the tax), its height is ΔP , and the excess burden of the tax can be expressed as

$$\text{area } ABC = (1/2) \cdot (-\Delta X) \cdot \Delta P \quad (1)$$

By definition, the absolute value of the price elasticity of demand (ϵ) in the pretax situation, that is, at the point B on the demand curve, is

$$\epsilon = -(\Delta X / \Delta P) \cdot P_0 / X_0 \quad (2)$$

which can be rearranged to give

$$-\Delta X = \epsilon \cdot \Delta P \cdot X_0 / P_0 \quad (3)$$

Substituting equation (3) into equation (1) yields

$$\text{area } ABC = (1/2) \cdot \epsilon \cdot (\Delta P)^2 \cdot X_0 / P_0 \quad (4)$$

Noting, however, that $\Delta P = P_1 - P_0 = (1 + t) \cdot P_0 - P_0 = t \cdot P_0$, equation (4) can be rewritten as

$$\text{area } ABC = (1/2) \cdot \epsilon \cdot t^2 \cdot P_0 \cdot X_0 \quad (5)$$

Hence, the excess burden of the tax varies positively with both the price elasticity of demand in the pretax situation and the magnitude of the (squared) tax rate itself.⁴ Since equation (5) only involves parameters that are in principle readily observable, the calculation of the area ABC is relatively straightforward.

There is much controversy in the literature about the DMH measure of excess burden. At the root of the controversy is the question concerning the validity of using the concept of consumer surplus as a measure of consumer net welfare. While much of the debate involves highly technical issues beyond the scope of this Handbook, it is instructive to illustrate the following problematic aspect of the DMH measure. As noted earlier, any change in the price of a commodity entails both an indirect income effect and a substitution effect. Hence, a movement along an ordinary demand curve, such as the one from point B to point A in Figure II.1, represents the consumer's response not only to the change in the price of the commodity, but also to how the price change has indirectly affected his valuation of his income position, and therefore his welfare. This implies that the area ABC does not represent the true amount of monetary compensation the consumer would require, relative to the pretax situation, to leave him as well off in the posttax situation as in the pretax situation.

The above reasoning is most easily appreciated in an example where the ordinary demand curve is vertical, so that the quantity demanded is not affected by any price change. In this case, the DMH measure of excess burden will vanish, as can be visualized from Figure II.1 with a vertical DD' curve, or confirmed from equation (5) with $\epsilon = 0$. Yet, the consumer's welfare must have changed (beyond that which can be accounted for by the tax payment), since the tax has distorted relative prices compared with the pretax situation. Hence, the DMH measure would provide an inaccurate picture of the true excess burden of the tax.

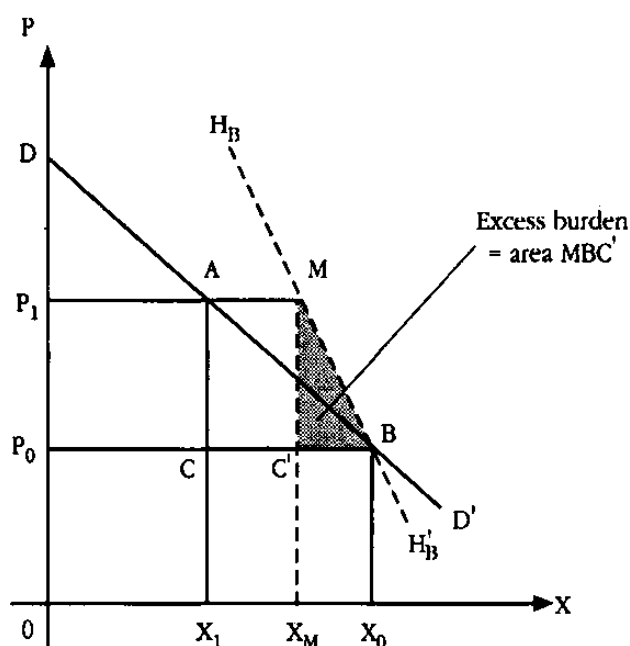
Hicksian measures

To circumvent the problem of the DMH measure, Hicks proposed replacing the use of ordinary demand curves with compensated demand curves. A compensated demand curve abstracts from the indirect income effect of any price change. It thus depicts the relationship between the price and the quantity demanded of

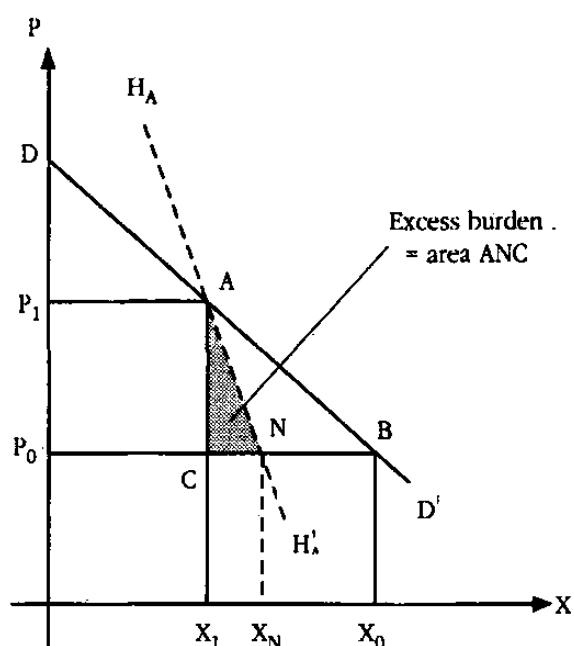
⁴The expression in equation (5) gives an exact measure of the excess burden only when the demand curve is linear, as drawn in Figure II.1. For a nonlinear demand curve, the exact area of the "triangle" can only be found by integration. For a sufficiently low tax rate, however, the error involved in using equation (5) to approximate the excess burden under a nonlinear demand curve would be small.

Figure II. 2. Hicksian Measures of Excess Burden

(a) Measure based on compensating variation



(b) Measure based on equivalent variation



a commodity purely on the basis of the substitution effect. The relationship between the ordinary and compensated demand curves, *given particular initial situations*, is provided in the two panels of Figure II.2, which also reproduces all the important aspects of Figure II.1.

Consider panel (a) of Figure II.2. The rise in the price from P_0 to P_1 as a result of the tax reduces the quantity of X demanded from X_0 to X_1 as before. Suppose now that the consumer receives, simultaneously with the price increase, a monetary compensation just sufficient to offset its associated adverse welfare impact. It is then easy to infer that the reduction in his quantity of X demanded with compensation (such as from X_0 to X_M) would normally be less severe than that without compensation (such as from X_0 to X_1). Hence, starting with a given initial situation such as point B , for every price change, a point such as M can be ascertained after the consumer has been fully compensated. The curve that traces out all such points is the compensated demand curve *associated with the given initial situation*. In panel (a) of Figure II.2, this curve is denoted by $H_BH'_B$. The compensated demand curve is always negatively sloped on account of the substitution effect, and would be more steeply sloped than the ordinary demand curve whenever the commodity in

question is a normal good, that is, a good with a positive income elasticity of demand.

Since the derivation of the compensated demand curve requires that the consumer be fully compensated for the indirect income effect of a price change, movements along it will, by definition, maintain a constant level of consumer welfare. The amount of compensation that is required to ensure this welfare constancy following any price change, which is known as the *compensating variation*, is measurable by the area of the trapezoid between the new and old price lines under the compensated demand curve, that is, the area P_1MBP_0 in panel (a) of Figure II.2, following the price increase from P_0 to P_1 . With compensation, however, the consumer would be demanding X_M of commodity X , and his tax payment would be the area of the rectangle $P_1MC'P_0$. Hence, the excess burden of the tax, based on the Hicksian compensating variation, is the area of the triangle MBC' . Clearly, this area is *smaller* than the corresponding DMH measure of excess burden, given by the area ABC .

Given the methodology of deriving compensated demand curves described above, a separate compensated demand curve can be obtained for every point on the ordinary demand curve, each representing a particular

underlying level of consumer welfare associated with that point. In panel (b) of Figure II.2, the compensated demand curve associated with the posttax situation (i.e., point A on the ordinary demand curve) is shown as $H_A H_A'$. Since the price at point A is higher than that at point B , the welfare level associated with $H_A H_A'$ must be lower than that associated with $H_B H_B'$. Hence, once the consumer is in the posttax situation, the amount of money he is willing to pay to have the tax abolished to maintain his posttax welfare level, which is known as the *equivalent variation*, is generally not the same as the amount of monetary compensation (the compensating variation discussed above) that is required to keep him at the same pretax welfare level for accepting the tax. The equivalent variation is measurable by the area of the trapezoid $P_A ANP_0$ in panel (b) of Figure II.2. The excess burden of the tax, based on the Hicksian equivalent variation, is the area of the triangle ANC . This area is also *smaller* than the corresponding DMH measure of excess burden.

The Hicksian measures underscore the importance of the choice of the reference point in measuring the efficiency loss of a tax, since the value the consumer places on his income position changes in general with his income level (e.g., he may value a marginal dollar higher when he is relatively poor than when he is relatively wealthy). In other words, the efficiency loss of a tax of a particular magnitude is generally not unique and depends on a number of factors that define the reference point against which the loss is to be evaluated. The particular policy question to which this evaluation is designed to respond usually provides an indication for the correct choice of the reference point, which in turn would dictate which of the two Hicksian variations would be the appropriate measure to use.⁵ For example, the compensating variation would provide the appropriate measure of the efficiency loss in introducing a given tax, while the equivalent variation would provide the efficiency gain in abolishing an existing tax.

A shortcoming of the Hicksian measures is that, unlike the DMH measure, neither of them can be calculated in a straightforward manner. The quantities X_M (panel (a) of Figure II.2) and X_N (panel (b) of Figure II.2), for example, cannot be obtained directly from consumption data. Yet, they must be ascertained before the respective areas MBC' and ANC can be computed. While fairly sophisticated methods are available

in economics to estimate a compensated demand curve, their information requirements are usually too severe for them to be applicable in most developing countries. Hence, the question arises as to what extent the DMH measure could be used as an approximation of the true excess burden of a tax.

Approximating excess burden

It is clear from the above discussion that, in the absence of income effects (the so-called vertical Engel curve case),⁶ the ordinary demand curve is identical to the compensated demand curve, and the DMH and Hicksian measures will all be the same. Save for this special case, the use of the DMH measure will always involve an error, and the magnitude of the error will depend on the magnitude of the underlying income elasticity of the commodity in question. The bounds of this error have been numerically simulated by Willig (1976) based on alternative upper and lower bounds of income elasticity values within a given price range. Not surprisingly, a general conclusion that can be drawn from the simulation results is that the closer these upper and lower bounds are to each other, the smaller the proportionate error involved in using the DMH measure to approximate either of the Hicksian measures. Whether any such error is considered acceptable must lie entirely with the judgment of the policymaker.

Complications with Multiple Taxed Commodities

There are primarily two separate, but related, complications arising from the taxation of multiple commodities. The first involves the problem of the *interdependence of demand*; the second is concerned with the *path dependence* of multiple price changes.

Consider first the DMH measure of excess burden. If the demand for commodity X depends, in addition to its own price, on the price of commodity Y , then the combined excess burden in taxing both commodities would not simply be the sum of the excess burdens of the two taxes computed independently of each other, as the ordinary demand curve for X is shifted by the tax on Y , and vice versa. On the surface, it seems that this demand interdependence can be easily overcome by adding the two relevant excess burdens *after* incorporating the effect of such shifts. In actuality, however, a rather serious conceptual difficulty is involved, which is that the manner in which the shifts will occur depends on the sequence (i.e., path) of the two price changes. Intuitively, the path dependence problem can

⁵Readers who are familiar with the construction of index numbers, such as the consumer price index, would immediately recognize that the difference between the compensating and equivalent variations is conceptually akin to the difference between the Laspeyres and Paasche index formulae.

⁶The Engel curve depicts the relationship between the income levels and the quantities demanded of a commodity.

be understood in the context of the reference-point issue discussed earlier in connection with the Hicksian measures. Hence, the extent of the shift in the ordinary demand curve for Y as a result of a tax on X , when a tax on Y has already been introduced, is generally different from that when the tax on Y has not been introduced, because the presence or absence of the tax on Y can give rise to the consumer placing a different value on his income position. It is a similar situation for the shift in the ordinary demand curve for X . Only in the special case where a given income change would induce the same proportionate change in the demand for both goods would such shifts in the ordinary demand curves be path independent.⁷

In contrast to the DMH measure, the two Hicksian measures are always path independent, by virtue of the unique

⁷Technically, this special case is known as the case of homothetic demands.

(albeit different) reference point that underlies each of them. The calculation of the consumer's required monetary compensation (his compensating variation), for example, to leave him as well-off in the posttax situation as in the pretax situation, involves only his welfare level in the pretax situation as a yardstick; the path of subsequent price changes is, therefore, immaterial in the assessment process. The very derivation of the DMH measure, on the contrary, which requires calculations involving situations with different welfare levels, makes its dependence on the path of price changes inevitable.

As with the case of the single taxed commodity, the extent of the error involved in using the DMH measure in the multiple taxed commodity case, notwithstanding its path dependence problem, is related to the income tax elasticities of the various commodities concerned. The smaller the variations among these income elasticities, the closer the DMH measure approximates the Hicksian measures.

Taxation and Equity

HOWELL H. ZEE

- *What are the different concepts of equity, and how do they translate into different principles of taxation?*
- *What are the alternative measures of income inequality and their implications for tax equity?*
- *What are the alternative theories of distributive justice and their implications for tax equity?*

In formulating tax policy, the policymaker usually cannot avoid undertaking an evaluation, either explicitly or implicitly, of both the efficiency and equity implications of alternative tax measures, even though he may choose to assign unequal weights to them in the evaluation process. The concept and measurement of efficiency have been addressed in the previous section. The present section considers the equity aspects of taxation. The theory of optimal income taxation, which conveniently brings together the policymaker's efficiency and equity objectives, is discussed in Chapter IV.

Broadly speaking, equity means fairness. But any notion of fairness necessarily involves value judgment. A full treatment of the ethical foundations of alternative notions of fairness is beyond the scope of this Handbook. Instead, the emphasis here is placed on the operational significance, rather than on philosophical underpinnings, of a few important aspects of equity considerations in formulating tax policy.

Basic Concepts and Principles⁸

Equity issues in taxation are generally examined under the two complementary rubrics of *horizontal equity* and *vertical equity*: the former calls for the equal tax treatment of equal individuals, while the latter calls for the unequal tax treatment of unequal individuals. While certainly appealing as general conceptual premises, these two equity concepts are of limited practical value unless and until (a) the basis for measuring equality (and inequality) among individuals is defined; (b) the meaning of equal (and unequal) tax treatment is specified; and (c) implementable tax principles to guide pol-

icy are derived. Unfortunately, none of these problems has an easy solution.

Defining equality among individuals

Consider first the problem of defining equality among individuals. This could be done either subjectively, such as in terms of individual welfare (commonly referred to as utility), which in turn is presumably dependent on a set of attributes deemed important to the individual concerned; or objectively, such as in terms of the individual's measurable income. Two individuals are then regarded as equal if they have the same level of utility using the former basis, or the same level of income using the latter basis.⁹ The use of the subjective basis would clearly pose difficult measurement problems; while that of the objective basis is also not without ambiguity, since income is not the only available yardstick by which equality can be measured. Why not total wealth, for example, or consumption, or some combination of all three?

Even if income is the selected yardstick, some fundamental issues remain to be resolved. Should income be measured with reference to the initial state or the end state? The initial-state criterion is associated with the *endowment* (or *entitlement*) *theory* of social justice, of which a well-known modern version is that of Nozick's (1974). According to this theory, an unequal distribution of income at any given time between two individuals may well arise from a difference in their initial endowments (e.g., innate productivity), to which both are equally entitled, and a subsequent just process (e.g., the market mechanism), to which both have equal access. In this case, the two individuals should effectively be treated as equals (i.e., no redistribution is called for). In contrast, the end-state criterion, to which both the *traditional welfare economics* and the celebrated *contractual theory* of social justice of Rawls (1971) (see below) adhere, is, as argued by Nozick, ahistorical and overlooks the process by which the end state is arrived at. While Nozick's interpretation of the traditional welfare economics is open to question, his fundamental point nevertheless has important implications for tax policy: if one views the initial endow-

⁸A classic treatment of various aspects of equity is available in Musgrave (1959).

⁹Hence, it is common to regard an income tax system that treats different types of income differently (e.g., applying differential tax rates or granting exemptions on the basis of different income sources) as one that violates horizontal equity.

ments of individuals as just, and the free market is a just process through which production and exchange are carried out, then the redistributive role of taxation would simply disappear.

Assuming that the more traditional end-state criterion is to be used, one is still left with the problem of determining its appropriate time dimension. Should income be measured at a given slice of time, say, annually, or intertemporally, say, over the individual's lifetime, or even intergenerationally, when different generations are linked by bequests? Equity implications of many tax policies are quite different depending on one's chosen perspective regarding the above issues.

Specifying equality in tax treatment

As with defining equality among individuals, equality in tax treatment can also be specified in a number of ways. The most general specification would be in terms of equality of *net sacrifice* in individual utilities as a result of the tax, that is, gross sacrifice less benefits received from public expenditures financed by tax revenue. This specification requires not only an interpersonal comparison of utilities, but also a method for measuring the benefits of public expenditures, which, in the presence of externalities or the free-rider problem or both, is known to be difficult if not impossible.

Even if a much narrower specification is used, such as one based entirely on readily measurable nominal tax payments, there are still various possible choices of the measurement basis. For example, should equality in tax treatment be measured in *absolute* amounts or in *relative* (e.g., to income) terms? And if the relative basis is chosen, should an *average* or *marginal* rate be used? Equity evaluation cannot proceed until a decision on these matters has been made.

Tax principles

There are two common, but fundamentally different, tax principles by which the equity of a tax system can be examined. The first is the *benefit principle*, which states that individuals should be taxed according to the benefits each would receive from expenditure programs to be financed by tax revenue. This principle is consistent with both horizontal and vertical equities, since individuals receiving the same (different) benefits will be identically (differentially) taxed. It also implies, at the margin, that no individual would bear any net sacrifice in utilities from taxation.

Apart from the obvious difficulty, as noted earlier, in measuring the benefits of public expenditures, the application of the benefit principle ties tax policy exclusively to expenditure policy. While under certain circumstances it may serve as a guide for identifying

equitable sources of financing for some specifically targeted expenditure programs (such as in designing user fees), the benefit principle is of limited relevance in practice when equity aspects of tax policy must frequently be addressed on their own.

The second tax principle is the *ability-to-pay principle*, which is an alternative to the benefit principle and states that individuals should be taxed according to their abilities to bear the tax burden. Clearly, this principle is also consistent with both horizontal and vertical equities, and, at the same time, it severs the tie between tax and expenditure policies. Its practicality, however, depends on making the concept of ability to pay operative.

A reasonable indicator of ability to pay is certainly income, although other indicators, in particular wealth, could be as compelling. If income is chosen, this principle is usually invoked to support a progressive income tax on grounds of vertical equity, although the idea of progressivity is again subject to the kind of alternative interpretations noted above (absolute versus relative and average versus marginal).

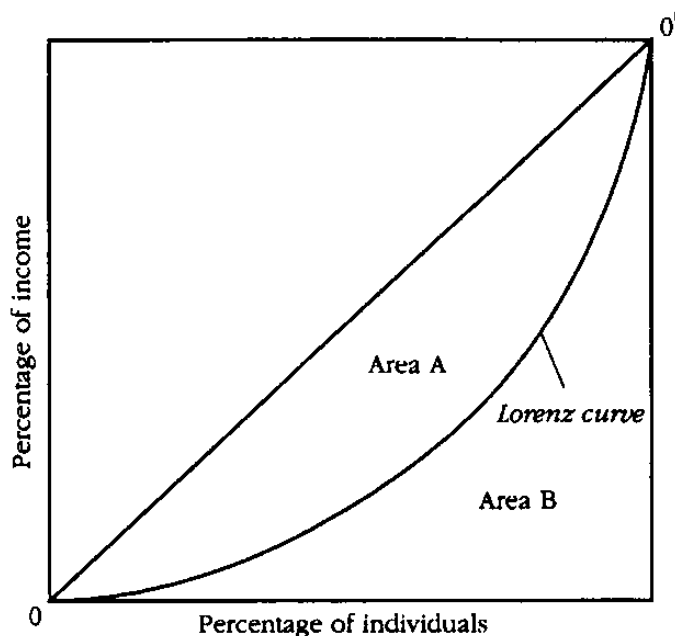
Equity as Redistribution

A possible way to give concreteness to the meaning of equity is to interpret it only in the context of redistribution (of income, wealth, and/or other variables of interest). Hence, a tax is equitable (inequitable) if the degree of inequality in the distribution of a relevant variable in the posttax situation is less (more) than that in the pretax situation. Furthermore, such an approach lends itself directly to an evaluation of relative degrees of equity in alternative taxes.

To give practical content to the above interpretation of equity, an index that measures the degree of inequality is required.¹⁰ Two such indices are discussed below: the widely used Gini coefficient, which is ostensibly *positive* (or *descriptive*), but which can be shown to make use of an implicit set of weights on different income levels in its construction, and the more recent Atkinson index (1983), which is explicitly *normative* (or *prescriptive*). The normative nature of the Atkinson index is particularly important because it can easily be interpreted in ways that would encompass a broad spectrum of theories of distributive justice.

¹⁰In conformity with the general practice adopted by the literature on this topic, it is assumed from now on that inequality is measured with reference to the distribution of income over some given period of time.

Figure II. 3. The Lorenz Curve



Gini coefficient

Formally, the Gini coefficient, G , of a given distribution of income is computed as half of the arithmetic average of the absolute differences between all pairs of income levels in the distribution. It is best understood in terms of the distribution's *Lorenz curve* (Figure II.3), which shows the relationship between the percentage of income (vertical axis) and the percentage of individuals (horizontal axis). If the distribution of income is completely equal among individuals, the Lorenz curve would coincide with the diagonal line OO' . The Gini coefficient is simply the ratio of the area above the Lorenz curve (area A) to that below the diagonal line OO' (sum of areas A and B). Its value is therefore bounded between zero (complete equality) and unity (complete inequality, i.e., the entire income accrues to one individual).

Algebraically, the Gini coefficient can be stated as

$$G = 1 + 1/n - (y_1 + 2 \cdot y_2 + \dots + n \cdot y_n) \cdot 2 / (n^2 \cdot \mu), \quad (6)$$

where n is the number of individuals, y_i is the income level of individual i , with $y_1 \geq y_2 \geq \dots \geq y_n$, and μ is the average income. Equation (6) makes it clear that the Gini coefficient involves assigning weights to the different income levels based on their rank order, that is, the highest income level (y_1) has a weight of unity, while the lowest income level (y_n) has a weight of n .

To be consistent and meaningful, any inequality index must possess the fundamental property (the so-

called Dalton transfer principle) that, for a given total income, a redistribution of income from a richer to a poorer individual must reduce its measure of inequality (and vice versa). The Gini coefficient has this property, as can be easily verified from equation (6), or deduced from Figure II.3. A redistribution from the rich to the poor would raise the Lorenz curve toward the diagonal line OO' , and the Gini coefficient would accordingly be reduced.

There is, however, a conceptual difficulty in using the Gini coefficient. If two different income distributions have Lorenz curves that cross each other, so that their relative degrees of inequality vary across income ranges, their computed Gini coefficients would be problematic for comparing the relative inequalities between the two distributions over their entire income ranges as a whole, since the rank order of the numerical values of the coefficient for the different distributions is an artifact of the particular (and arbitrary) pattern of weights, noted above, in the coefficient's computation formula. This difficulty is overcome by the Atkinson index through the use of an explicit normative parameter.

Atkinson index

The Atkinson index, A , is given by

$$A = 1 - y_e / \mu, \quad (7)$$

where y_e is the "equally distributed equivalent income," or the amount of income, if distributed equally, that would produce the same level of "social welfare" as the actual distribution. It is given by

$$y_e = [(y_1)^\epsilon + (y_2)^\epsilon + \dots + (y_n)^\epsilon] / n^{1/\epsilon}, \quad (8)$$

where $\epsilon \leq 1$ and whose value represents the policymakers' explicit value judgment about how inequality impacts on social welfare.¹¹ The significance of the parameter ϵ can be appreciated intuitively by noting the following. If $y_i = \mu$ for all i in equation (8), that is, if there is complete equality in income distribution, then $y_e = \mu$ regardless of the value for ϵ . In this case, by equation (7), $A = 0$, that is, the index indicates that there is no inequality as expected. However, even if a single individual receives all the income, A would still be zero if $\epsilon = 1$; that is, irrespective of the underlying actual distribution, the index would show "no inequality" because the policymaker does not care about how income is distributed. Putting it differently, redistribution in this case would have no impact on social wel-

¹¹If $\epsilon = 0$, equation (8) is not well defined. This equation, however, approaches a well-defined expression as ϵ approaches zero. The significance of this case is discussed below.

fare. As the value of ϵ (which could be negative) is lowered, the social welfare impact of any redistribution from the rich to the poor will be increasingly significant for any existing unequal income distribution. A direct implication of the above is that the Atkinson index satisfies the Dalton transfer principle for all allowable values of ϵ except when it equals unity—a limiting case that corresponds precisely to a particular theory of distributive justice (see below).

Strictly speaking, then, the Atkinson index measures not the degree of inequality per se, but rather the social welfare loss from inequality. The main advantage it enjoys over an alternative inequality measure such as the Gini coefficient is that, if the Atkinson index of one distribution is found to be higher than that of another for all values of ϵ , then the Lorenz curve of the former would lie entirely below that of the latter (and vice versa), in which case the Gini coefficient would yield an identical rank order.¹² The case of the intersecting Lorenz curves would be detected by one or more reversals in the rank order of the Atkinson index for some value(s) of ϵ . In this case, the relative inequalities between the two distributions will depend on the chosen value of ϵ which, as stated earlier, represents an explicit value judgment on the part of the policymaker.¹³

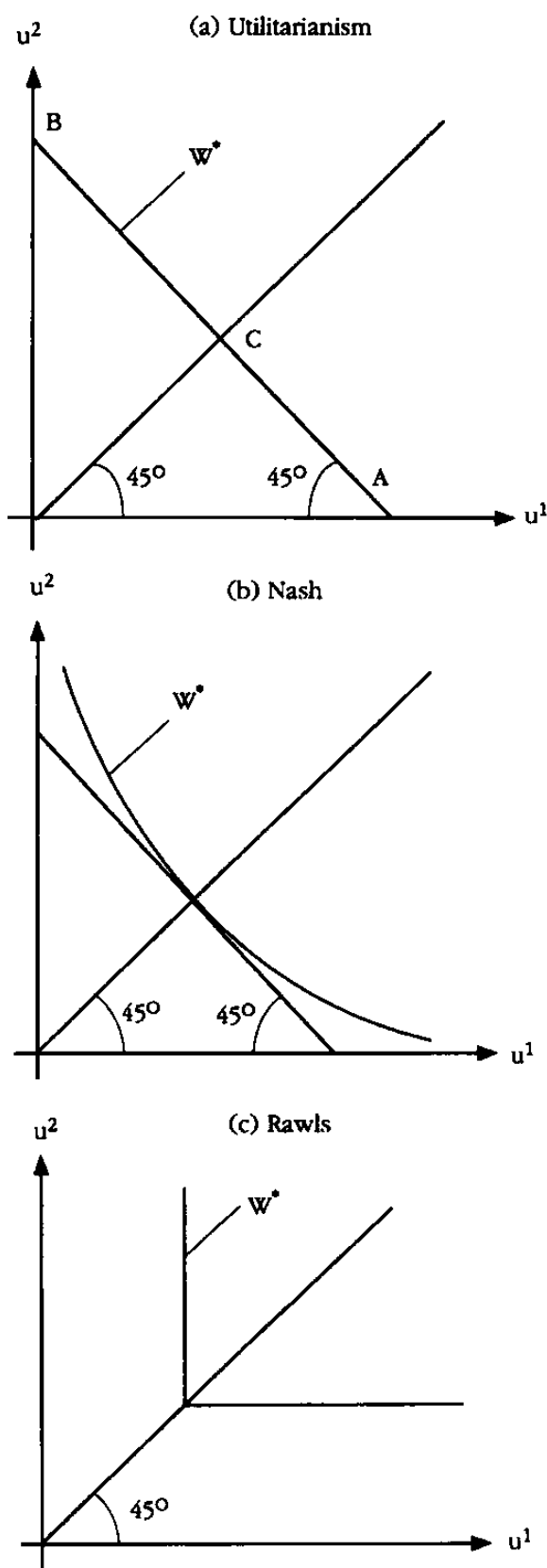
Distributive Justice

In the traditional welfare economics approach, distributive justice is examined through the conceptual construct of a *social welfare function*—a function showing the relationship between individual welfare (or utilities) and welfare for the society as a whole. If individual i 's utility, U^i , depends on his income y_i , that is, $U^i = U^i(y_i)$, then the social welfare function is simply a formula which combines all the U^i 's into an index for social welfare, W :

$$W = W[U^1(y_1), U^2(y_2), \dots, U^n(y_n)]. \quad (9)$$

Differences among alternative theories of distributive justice can then be sought in the different formulae used in constructing the social welfare index W . Three important benchmark theories of distributive justice

Figure II. 4. Three Benchmark Theories of Distributive Justice



¹²Some additional technical assumptions, whose treatment is beyond the scope of this Handbook, are needed to prove these results formally.

¹³Readers who are familiar with the literature on risk and uncertainty would immediately recognize that $(1 - \epsilon)$ corresponds to the coefficient of relative risk aversion (a constant in the present formulation). Hence, ϵ could be interpreted as a parameter measuring the intensity of the policymaker's aversion to inequality: the lower the value of ϵ , the higher his aversion intensity.

are discussed below and illustrated in the three panels of Figure II.4 for the simple case of a two-individual world.

Utilitarianism

The utilitarian theory states that society's welfare is simply the sum of individual utilities:

$$W = U^1 + U^2. \quad (10)$$

Equation (10) implies that there is a strict one-to-one trade-off between the utilities of two individuals for a given level of social welfare, that is, the distribution of utilities between them is totally inconsequential. This case is depicted graphically in panel (a) of Figure II.4 by an *iso-welfare contour*—a contour that traces out all the combinations of U^1 and U^2 that would give rise to a given level of social welfare W^* . As illustrated, under utilitarianism, the iso-welfare contour is a straight line with a negative slope of unity. Hence, social welfare is the same regardless of whether W^* is allocated entirely to individual 1 (point A), entirely to individual 2 (point B), or equally between them (point C).

Nash

In contrast to the utilitarian theory, the Nash theory of distributive justice gives weight to the underlying distribution of individual utilities in the form of

$$W = U^1 \cdot U^2. \quad (11)$$

Equation (11) implies that, in attaining a given level of social welfare, the trade-off between the utilities of two individuals is not a one-to-one relationship, that is, their relative utilities matter. The iso-welfare contour under Nash is depicted graphically in panel (b) of Figure II.4. It has a slope of negative unity only at the 45-degree line, along which individual utilities are equal. As one moves away from the 45-degree line in either direction, the slope of the contour steepens with respect to the axis of the poorer individual, that is, in computing social welfare, the equivalent worth of the utility of the poorer individual, in terms of that of the richer individual, increases as one deviates further from equality.

Rawls

The Rawlsian theory of social justice goes beyond Nash's in attaching importance to the underlying distribution of utilities. In fact, it states that society's welfare is simply represented by the individual who has the least utility:

$$W = \text{minimum of } [U^1, U^2]. \quad (12)$$

Because Rawls equates social welfare with the welfare of the least well-off, this theory is strongly egalitarian; that is,

no amount of increase in the utility of the richer individual can offset a decrease in that of the poorer individual in attaining any given level of social welfare. This is depicted in panel (c) of Figure II.4, where the slope of the iso-welfare contour is vertical with respect to the axis of the poorer individual in either direction away from the 45-degree line. As social welfare cannot be increased unless the welfare of the least well-off is increased, the Rawlsian theory is commonly referred to as the *max-min* theory of distributive justice.¹⁴

A synthesis

Clearly, the utilitarian and Rawlsian theories represent two limiting cases of distributive justice: the former assigns no weight to inequality in distribution, the latter views equal distribution as the all-important goal. The Nash theory lies somewhere in between. The following is a social welfare function that could encompass the entire spectrum of distributive justice—from utilitarian to Rawlsian—by varying a single normative parameter:

$$W = [(U^1)^\epsilon + (U^2)^\epsilon]^{1/\epsilon}, \quad (13)$$

with $\epsilon \leq 1$. Equation (13) reduces to equation (10)—the utilitarian case—with $\epsilon = 1$, and to equation (12)—the Rawlsian case—with ϵ approaching $-\infty$. Letting ϵ approach zero yields the Nash case.¹⁵

A comparison between equations (8) and (13) reveals that the latter is essentially the same formula used to calculate y_e in the Atkinson index of inequality, except that utilities, rather than incomes, of individuals appear in the social welfare formula. If the utility functions of all individuals are the same, equal utility distribution would imply equal income distribution; otherwise, this obviously will not hold.

The social welfare formula of equation (13) provides the policymaker with a concrete way of integrating equity concerns into tax analyses, and, by having to choose a value for ϵ , forces him to make his notion of distributive justice explicit.

¹⁴Rawls' argument for the max-min justice is rich and complicated. A simple explanation is as follows. Imagine all individuals of a society at the beginning of time (the "original position"), with no foreknowledge about their endowments, opportunities, and wants (they are behind a "veil of ignorance"), are to agree to a binding social contract that would guarantee their subsequent well-being according to the contractual terms. Rawls argues that, under such circumstances, rational and egoistic individuals would agree to a contract guaranteeing an egalitarian outcome.

¹⁵Some elementary calculus, omitted here for simplicity, is required to demonstrate the last two results.

Concepts of Tax Incidence

RUSSELL KRELOVE

- *What are convenient ways to describe the effects of a tax?*
- *What is the process by which the economic incidence of a tax can differ from the statutory incidence?*
- *What factors determine the incidence of a tax?*
- *How can future taxes be borne in the present?*

Tax incidence is the positive analysis of the allocation of the burden of a tax, or of a system of taxes, among economic agents. The goal is to identify who in the economy ultimately bears the burden of a tax or taxes that might initially be levied on a particular economic activity or agent. Underlying this analysis is the assumption that the burden of taxation is described by its effects on the well-being of persons (and not on institutions), in their roles as consumers, producers, and factor suppliers.

The incidence analysis of tax burdens must be built upon a structure of assumptions about how the economy works. In particular, it relies on a theory of behavior and of economic equilibrium. In principle, the analysis is a straightforward two-step procedure. First, the equilibrium both before and after the change in tax policy is calculated. Second, the induced changes in equilibrium magnitudes, in particular the changes in prices and incomes, are used to calculate the changes in well-being of individuals as a consequence of the policy change. As such, the ideal incidence analysis demands data on the universe of tastes and technologies in the economy, an impossible goal. The challenge is to find fruitful simplifications, allowing the analyst to usefully describe the effect of policy while working within the usually strong informational constraints encountered both in developing and in developed economies. This section presents some examples of simple tax incidence analyses, drawing out four simple principles, presented below, that have great power and general applicability.

- In the standard competitive setting, who actually pays the tax (the economic incidence), that is, who ultimately bears the burden, is independent of who is statutorily required to pay the tax (the legal, or nominal incidence). This is one of the major insights of economic analysis applied to taxation: that the actual bur-

den of a tax does not necessarily rest on the agents upon whom the tax is levied. It has the important implication that a tax policy can have unintended consequences, as the burden is "shifted" elsewhere in the economy.

- The agents upon whom the tax is levied can shed some part of the burden of the tax only by altering their behavior in markets. The degree to which the tax can be "shifted" to others depends on the flexibility to alter behavior. In economics, such flexibility is usually measured by means of elasticities. The second principle is that economic incidence depends on elasticities, of demand, supply, and substitution. Generally, those individuals least able to alter their behavior in response to a tax change will bear a greater portion of the burden of the tax.

- It may take time for individuals to adjust behavior, as previously entered into commitments diminish or expire with time. Hence, long-run elasticities can differ from short-run elasticities, so that the long-run incidence of a tax can be different from the short-run incidence.

- Future tax liabilities on the return to a long-lived asset can have consequences in the present, as the future tax liability becomes incorporated into the price of the asset.

While incidence analysis is positive, it has a distinctly normative motivation. The purpose of incidence analysis is to help design good policy. Rational choice among available tax options to meet, *inter alia*, equity precepts requires the best available knowledge concerning which persons or classes of persons will ultimately bear the burden of the tax. The theory of incidence is thus an important and necessary step in tax policy recommendations.

Describing the Incidence of a Tax

In principle, one would like to calculate what happens to every individual in the economy as a result of the imposition of a tax. Since this is impossible, incidence analysis simplifies by focusing on the effect on certain clearly identifiable groups in the economy. A variety of distinctions have been employed. One useful categorization—the budget incidence approach—describes the distribution of the effect according to the

personal distribution of income, where the incidence is measured with respect to the position of individuals at different points in the income distribution. In this classification, taxes are described as being regressive or progressive as the burden tends to fall more heavily on lower income or higher income groups, respectively, and proportional when the pattern of incidence is uniform across income groups. Second classification—the partial equilibrium approach—involves a similarity of roles in the product market: the tax can be borne by producers, through a reduction in profit income; it can be borne by suppliers of factors to producers in this industry, through a reduction in their incomes; and it can be borne by consumers, through a reduction in consumers' surplus. In a third classification—general equilibrium approach—the effect of a tax is distributed among the main factors of production, the historically most important categories of factors being labor and capital. Other classifications include the regional distribution of the burden and the intertemporal distribution of the burden across generations. The partial equilibrium approach is adopted in this section, while the budget incidence and the general equilibrium approaches are developed in a subsequent section.

Incidence of an Excise Tax in One Market

In this section, we analyze the effect of an excise tax imposed on transactions in a commodity to allocate the burden of the tax among consumers, producers, and factor suppliers. As mentioned previously, conclusions about the distribution of tax burdens are based on a foundation of assumptions about how the economy works. Assume that participants in the market for the taxed commodity act competitively, so that equilibrium prices and quantities are determined at the intersection of market demand and supply curves which, as usual, are graphical descriptions of competitive, maximizing, demand and supply behavior. Also, assume that repercussions on other markets from the imposition of the tax on the market under consideration are of second order magnitude and as such, can be ignored in the incidence calculations; that is, the analysis is partial equilibrium in nature.

The effect of the imposition of an excise tax on a competitive market¹⁶

Consider the market for some good, called good X. This market is perfectly competitive, with behavior on the two sides of the market summarized by market de-

mand and market supply curves. The initial equilibrium is at a price p_0 , and industry quantity Q_0 . At this equilibrium, if the demand curve is negatively sloped, there is some consumers' surplus generated, which is represented geometrically by the area under the demand curve and above the price line. Similarly, if the market supply curve is positively sloped, the initial equilibrium generates some producers' surplus, represented geometrically by the area above the supply curve and below the price line. The market supply curve may have a positive slope for a number of reasons, and the recipient of the producers' surplus depends on the factor generating the finite elasticity. If supply price rises with quantity because of the presence of a fixed factor, the producers' surplus represents the return to this fixed factor. Alternatively, if supply price rises with quantity because other factors must be paid a higher return to be attracted away from employment in other industries, then producers' surplus is a measure of the inframarginal rents to this factor generated in this market.

Now, if a tax is imposed on the consumption of commodity X, a wedge is placed between the prices faced by consumers and producers. Consumers care only what must come out of their pocket to purchase the good; this is the consumer price, denoted q , that determines consumer behavior. Producer supply behavior, however, is determined by the portion of the amount paid by consumers that suppliers can keep; this is denoted p , the producer price of X. The difference, of course, is the amount of the tax, the share of the price taken by the government. The tax induces a new equilibrium in this market, with lower equilibrium quantity transacted, written Q_1 . Consumers now pay price q_1 , higher than the initial price p_0 , and suppliers receive p_1 , less than the original price p_0 . Both producers' surplus and consumers' surplus have decreased as a result of the tax: the fall in consumers' surplus is approximately equal to $dq \cdot Q_1$, where $dq = q_1 - p_0$ is the change in consumer price, and the fall in producers' surplus is approximately equal to $dp \cdot Q_1$, where $dp = p_0 - p_1$ is the absolute value of the change in producer price. Note that the sum of the lost consumers' surplus and producers' surplus is $dqQ_1 + dpQ_1 = (q_1 - p_1)Q_1$, which is just equal to the tax revenue collected, since $q_1 - p_1$, which measures the wedge between consumer and producer prices, is just equal to the tax per unit.

If consumers are paying a higher price after the imposition of the tax and if producers are receiving a lower price, then both consumers' surplus and producers' surplus fall; that is, both producers and consumers pay some portion of the tax. On the supply side, the in-

¹⁶The analysis of the effects of an excise tax can be found in any public finance text. See, for example, Musgrave and Musgrave (1989), or Stiglitz (1988). A classic treatment of incidence issues can be found in Brown (1979) (reprint of 1924).

cidence of the tax is on the claimant of the producers' surplus, either the owners of the fixed factor, or the suppliers of the factor whose factor payment falls as demand for that factor falls as output falls in this industry.

Incidence is independent of the taxed side of the market

The tax places a wedge between the consumer and producer prices of the product. It is these prices that determine demand and supply behavior, respectively, and thus the equilibrium quantity in the market. What is determining is the magnitude of the wedge itself and not how the wedge is generated, whether by placing the legal requirement to remit the tax on consumers or on producers. Since the equilibrium outcome in the market is independent of the legal incidence of the tax, the economic incidence is likewise independent. It follows that levying the tax assessment on consumers or producers, or dividing the tax assessment between them in any proportion, has no effect on the incidence of the tax.

Incidence depends on elasticities of supply and demand

It can be shown that, to a first order approximation, the share of the excise tax borne by demanders, measured by the fall in consumers' surplus, is given by the expression $e_S/(e_D + e_S)$, where e_S is the elasticity of the supply curve, and e_D is the (positive) elasticity of demand. That is, economic incidence depends on elasticities of supply and demand. This expression indicates that when consumers cannot easily adjust their behavior in response to the tax, that is, when e_D is close to zero, demanders tend to bear the greater proportion of the tax. When demand is perfectly inelastic (e_D is equal to zero), consumers bear all of the tax. Similarly, when suppliers cannot easily adjust their behavior, that is, e_S is close to zero, consumers pay only a small portion of the tax. When supply is perfectly inelastic (e_S is equal to zero), producers bear all of the tax. Thus, the burden of the tax tends to fall on low-elasticity agents in the market, those who cannot easily adjust their behavior in response to the tax. The greater buyers' abilities to substitute other commodities for the taxed commodity, the greater their ability to shift taxes. Likewise, if producers can easily leave an industry where taxes are being levied, the supply curve is elastic and the tax tends to be borne by consumers. For if sellers were forced to bear the tax, they would earn a sub-normal rate of return leading them to cease production.

To measure the incidence effects of the tax on consumers and producers, data are required on the elasticities of supply and demand.

Applications and Extensions

Incidence of a subsidy

It is useful to consider a subsidy on purchases of a commodity as equivalent to a tax, levied at a negative rate. As such, the previous analysis applies. Thus, it is irrelevant whether the subsidy is paid to producers or to consumers. Further, those who actually receive the subsidy (pay the negative tax) are not necessarily the ultimate beneficiaries of the subsidy program. The benefit of the subsidy is distributed among consumers and producers according to the elasticities of supply and demand, with the consumers' share given by $e_S/(e_D + e_S)$.

Incidence of a tax on labor

The principles of incidence derived above apply to all taxes levied on competitive markets, including factor markets. Consider for example the imposition of a payroll tax in a labor market. Then, as before, the incidence of this tax is independent of the distribution among employers and workers of the legal obligation to pay the tax. The incidence depends on the elasticities of supply and demand. If, as is frequently claimed, the supply of labor is relatively inelastic, most of the burden of the tax falls on workers, regardless of the legal imposition of the tax.

If leisure is a normal good for workers, then income and substitution effects on labor supply of a change in price are offsetting, and it is possible under these circumstances that the labor supply curve bends backwards. Then if the initial equilibrium lies in the range where labor supply is negatively sloped, the imposition of a tax on this market can be more than 100 percent borne by labor—that is, the wage falls by more than the amount of the tax. This occurs because the decrease in wages induces a positive labor supply response, which further drives down the wage. Since workers in this case bear more than all the tax, the demanders of labor, that is employers, must actually benefit from the imposition of the tax on labor.

Tax capitalization—future taxes can be borne in the present

Future taxes levied on durable assets or on their return, or future taxes that are shifted onto durable assets, can be borne in the present, through their effect on current asset prices. This outcome is referred to as tax capitalization. The most obvious example arises with respect to a tax levied on the rent of land, which, applying a previously derived principle, is borne by land, since the supply is fixed. Asset-market equilibrium then requires that the price of land fall to equate

the return to holding land with the returns from other assets.

Because of tax capitalization, the owner of a durable asset at the time of the unexpected change in the tax rate would bear the full burden of the whole stream of future payments. A purchaser who came along later would bear none of that burden because he would have obtained the property for an amount less than he would have had to pay before the tax increase. Similarly, the removal of a tax on a durable asset benefits the current owner, who may differ from the owner at the time the tax was imposed, the person who bore the burden of the tax in the first place.

More generally, to the extent that a tax on a durable asset cannot be shifted, or to the extent that a tax is shifted to a durable asset, the burden of present and future taxes is borne by the owner at the time the tax is levied.

As a corollary of tax capitalization, some of the effects of a tax may be felt even before the tax is imposed. Such effects are commonly labeled "announcement effects." When an announcement is made concerning the future tax treatment of an asset, it has an immediate impact on the value of the asset, through its impact on the present value of the return to holding that asset. In this case, holders of the asset at the time the announcement is made will bear part of the tax burden.

Transition Incidence

In most industries, a distinction can usefully be made between the short run and the long run. In the short run, many things are fixed that in the long run

can vary. While capital presently being used in some industry cannot easily be converted for use to produce other goods, in the longer run, new investment can be diverted elsewhere, while the capital presently employed depreciates and is not replaced. Thus, in the long run, the supply elasticity is much higher than in the short run. A tax on the return to capital in this industry will then be borne by owners of capital until that capital wears out. But in the longer run, new investment does not occur, output falls, and output price rises, so as to generate a rate of return to capital in this industry equivalent to the return in other industries. During the transition, the tax is borne by capital. This is the transition incidence of the tax. In the long run, however, when the supply of capital is elastic, the tax is borne by other factors and by consumers.

If there is free entry of capital into an industry in the long run, supranormal profits in that industry cannot persist. Then, since a subsidy can be considered a negative tax, preferential tax treatment of an industry can benefit capital owners in that industry during the transition, since they will earn above normal profit. This advantage will be competed away in the long run, as the above normal profit attracts new investment to the industry. The advantage during the transition, however, can be substantial enough to make it worthwhile for producers in the industry to lobby for the preferential treatment.

Similar transition incidence effects arise in a variety of economic circumstances involving the longer-term nature of some commitments, including human capital investments.¹⁷

¹⁷For a fuller discussion, see Bradford (1986).

General Equilibrium Incidence of Taxes

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- *Why is it important in incidence analysis to consider the general equilibrium interactions?*
- *What are the types of incidence results possible in tractable models that allow for interactions between markets? What are the strengths and limitations of the approach?*
- *What are the types of results possible from judgmental empirical studies and computable general equilibrium analyses of tax incidence, and what are the strengths and weaknesses of these approaches?*

For a tax on a commodity that will induce significant flows of resources between markets, analyzing incidence by focusing on just one market (i.e., engaging in partial equilibrium analysis, as in the previous section) can be misleading, both qualitatively and quantitatively. Conversely, the industry that is being analyzed can be affected by a change in the tax treatment in other industries. Furthermore, it is often not appropriate to focus on one market when considering taxes that apply across many markets, for example, broad-based sales taxes or factor taxes, since many prices will change in response to a change in the tax. What is necessary in these cases is to consider the interactions, that is, the equilibrating price changes in all markets, and the consequent change in the distribution of well-being. Price changes for both inputs and outputs for every market should be considered to arrive at an accurate assessment of incidence. For example, a tax on wheat which increases the demand for maize will increase the price of maize, which will feed back into the demand for wheat. On the supply side, if production of wheat falls, resources are released and if they are to be re-employed, must be absorbed into the production of other commodities, including maize. If the quantities of resources released are large, then the factor prices will change to induce other industries to absorb the surplus. These price changes will affect the well-being of owners of these factors. In addition, factor price changes imply cost changes for industries using those factors, so that competition will lead to changes in output prices. These price changes will affect the well-being of purchasers of commodities. Ripple effects involving adjustments of quantities of inputs and outputs across many markets will result in associated equilibrating price changes. Thus, the

change in the tax on wheat can induce widespread price changes, and an accurate incidence assessment must account for the effect of the totality of these changes on well-being.

Focusing on the effects of a tax in just the market where it is imposed may be reasonable when considering a tax on an activity that is "small" in relation to the economy as a whole. Under these circumstances, partial equilibrium analysis, a straightforward application of supply and demand, focusing on incidence on producers and consumers of that commodity, can provide considerable insight. Whenever the interactions are significant, however, a general equilibrium approach is necessary. This is especially the case with regard to taxes on the use of factors in some industries, for example, a tax on the income from capital used in the corporate sector, or a tax that applies to capital used in the agricultural sector only, or applies only to housing capital, or a tax levied on labor employed in the formal sector, with informal sector labor untaxed. In these and in other cases, a partial equilibrium analysis can be misleading, both quantitatively and qualitatively.

The purpose of this section is to provide an outline of the static general equilibrium analysis of taxation, roughly following the historical development of the topic. The focus lies on the analysis of taxes on factors; since factors, at the level of aggregation usually employed, are used across many markets, the estimation of changes in factor prices requires an essentially general equilibrium analysis. The next section outlines incidence results in the simplest possible model that can be used to analyze many important taxes, including a partial factor tax, that is, one that taxes the income of a factor only in selected sectors. Although the partial equilibrium results need to be modified when interactions are important, two important results from that analysis persist: that economic incidence is independent of the statutory incidence of the tax and that economic incidence depends on elasticities of demand of supply, and also of commodity and factor substitution. Extensions and limitations of the model are then considered. Subsequent sections examine two other empirical approaches to incidence analysis, judgmental studies of the burden distribution of taxes, which have tended to show that in developed countries the overall tax system is roughly proportional; and large scale

computer models that solve for the general equilibrium of a stylized representation of the economy. These studies attempt to explicitly model the interconnections among markets, overcoming the limitations of the implicit modeling of the judgmental studies.

An Important Example: Incidence Analysis in a Simple Competitive General Equilibrium Model

Model structure

In principle, the method of general equilibrium incidence analysis is straightforward: the general equilibrium of the economy is calculated first at the status quo, and again after the change in tax regime. The positions of all individuals in the two equilibria are then compared to determine the incidence of the tax. Practical incidence analysis involves making fruitful simplifications. One simplification is to aggregate so as to restrict the number of markets and the number of types of individuals to be considered. The simplest model has two consumption goods, produced with just two factors, capital and labor, that share the total income generated in the economy. Thus, there are four markets. The economy's fixed capital and labor endowments can be allocated to production of either good. The demand side of the economy—for goods—is treated as operating as if there were a single consumer. Because of this assumption, incidence effects resulting from differences in tastes among consumers cannot arise, so the focus is on the functional distribution of income, that is, the distribution of income between the owners of the two factors. Since this is general equilibrium, the use to which the tax revenue is put must be specified; the usual treatment is that the revenue is returned in a nondistortionary manner to the household sector.¹⁸

Possible taxes

A variety of taxes can be analyzed in this context. A general sales tax involves taxation of purchases of both goods. A general income tax would tax the income of both factors employed in both sectors. An excise tax would tax just purchases of one of the goods. A factor tax would tax income earned by that factor in both sectors. A partial income tax would tax incomes earned by both factors in just one of the sectors. A partial factor tax would tax income of that factor in just one of the sectors.

Tax-equivalence relations

Certain combinations of the taxes listed above are equivalent in their effects to other taxes, or combina-

tions thereof. These are mostly straightforward.¹⁹ Excise taxes on both goods at the same rate is equivalent to a broad-based sales tax, at the same rate. A broad-based sales tax is equivalent to an income tax, since on the consumer side, income equals consumption expenditure, and because factor supplies are fixed and the sales tax does not directly alter relative goods prices. Obviously, partial factor taxes on use of a factor in both industries at equal rates is equivalent to a factor tax at the same rate. A partial factor tax on both inputs in one industry is equivalent to a partial income tax in that sector, which is equivalent to an excise tax in that industry. Factor taxes on both factors at the same rate are equivalent to a general income tax, at the same rate.

Tax incidence results

The most technically complex and interesting incidence question involves a partial factor tax; this is analyzed in the next subsection. The incidence of other taxes are the following:

- A factor tax is not shifted if the supply of the factor is fixed. (In this case, the tax is borne completely by owners of that factor.);
- A general income tax is not shifted if all factor supplies are fixed. The tax is borne by the two factors in proportion to their shares of income;
- A general factor tax is borne by the two factors in proportion to shares of income; and
- An excise tax on one of the goods will in the first instance tend to cause costs and hence the price of that good to rise. As a consequence, demand and production in this industry will decline. As output declines, firms in this industry will release quantities of both inputs of production. These released inputs must be absorbed into the other sector. The functional incidence of the tax depends importantly on the terms under which firms in the untaxed sector are willing to absorb the released inputs. This depends in turn on the ratio of capital to labor being released by the taxed industry relative to the capital-labor ratio in the untaxed industry. For example, if capital and labor are being released in a ratio less than that currently employed in the taxed industry, then the relative price of labor must fall to induce that industry to absorb all of the released labor as well as the capital. The general result is that the price of the factor that is used relatively intensively in the taxed industry, falls. How much the relative price of the factor falls depends on the total quantities of factors released and reabsorbed (determined by the elasticities

¹⁸See Atkinson and Stiglitz (1980).

¹⁹See McLure (1975).

of demand for the two goods), and the substitutability of capital and labor in production of the goods (the elasticities of substitution in production, which indirectly describe relative elasticities of factor demands by firms).

Incidence of a partial factor tax

The effect of the imposition of a tax on the use of one factor in one industry can usefully be decomposed into two effects, called the output effect and the factor substitution effect. The output effect arises because the price of the good in the taxed sector will tend to rise and quantity fall, thus releasing resources from that sector. The output effect is thus equivalent to the effect of the imposition of an excise tax on this sector. As indicated above, the sign of the output effect depends on relative factor intensities, with the price of the factor used relatively intensively in the taxed sector falling. The magnitude of the effect depends on demand and factor substitution elasticities. The factor substitution effect arises from the partial factor tax in the first instance changing relative factor prices in the taxed industry, making the taxed factor relatively more expensive. Thus, even without a change in output, firms in the taxed sector would wish to substitute the untaxed factor for the taxed factor, releasing the taxed factor and demanding more of the untaxed factor. These changes in factor demands represent a second category of influences determining equilibrium factor prices. This effect always has the effect of lowering the relative price of the taxed factor, as long as some factor substitution is possible. The magnitude of the effect depends on relative factor intensities and the degree of substitutability of factors in production.

Adding the two effects gives the incidence of the tax. If the taxed sector is intensive in the taxed factor, then there is no ambiguity; the relative return to the taxed factor falls. If the taxed sector does not use the taxed factor intensively, the two effects offset and the result is ambiguous, depending on relative factor intensities and elasticities of demand and factor substitution. Thus, any outcome is possible. The value of the analysis is in indicating what information is important in determining the incidence of the tax. For example, the results indicate that only if the taxed sector is relatively intensive in the untaxed factor, can the tax be shifted to that factor.

Two aspects of the analysis should be noted. First, since after-tax factor returns are equalized across sectors by competition after the imposition of the tax, the incidence of the tax falls on factor owners in all industries, not just the taxed industry. Second, it is possible that total returns to owners of the taxed factor can fall by more than the amount of tax revenue raised. In this

case, owners of the untaxed factor actually benefit from the imposition of the tax. Conversely, it is possible that the tax is more than 100 percent shifted, that is, net incomes of owners of the taxed factor actually rise in response to the tax. Thus, the introduction of the tax may have an effect opposite of the intended effect.

Extensions and Limitations of the Model

The robustness of the results to model structure

The theoretical results discussed above rely on the assumptions made, and in this section, we investigate how those results are altered when some of the assumptions concerning technology and factor fixity and mobility are relaxed.

- *The effects of adding additional factors.* The model assumes only two factors, capital and labor. Certain sectors of the economy, however, particularly agriculture and real estate, employ not only labor and capital but also a third significant factor, land, which is relatively unimportant in the more highly taxed manufacturing sector.²⁰ This suggests, at the minimum, the introduction of a third, specific factor into the model. Shome (1981) shows that the qualitative properties of many of the two-factor results are preserved when such a third, specific, factor is added. The quantitative results differ, however, because with a third factor, factor substitutions generated by the switching of taxes are more complicated. The functional incidence results now depend on the elasticities of factor substitution among all three factors. It is possible that all mobile factors lose as a result of the imposition of a partial factor tax in the two-factor sector, with the specific factor in the nontaxed sector benefiting from the imposition of the tax.

- *Factor immobility.* The model assumes that capital and labor are equally productive in both sectors, and can costly migrate between sectors whenever factor returns are not equal. While such an assumption is appropriate for some factors, for example, unskilled labor, it is inappropriate for others. If the model is changed to allow for immobility of one of the factors, it is straightforward that a partial factor tax on that factor is borne entirely by owners of the factor in that use. The analysis of the incidence of an excise tax is also altered. As the mobile factor is released from the taxed sector and absorbed in the untaxed sector, the return to the fixed factor in the untaxed sector rises. In this case, the burden of the tax is shared between the mobile factor and the immobile factor in the taxed industry.

²⁰See Ratti and Shome (1977a).

- *Technological uncertainty.* The model assumes that all economic decisions are made in the presence of complete certainty regarding tastes, technologies, and prices. Uncertainty, however, pervades all aspects of the economy in developing as well as developed countries. It is a common observation that individuals act to avoid risk so that the presence of uncertainty materially affects behavior. Taxation, by altering the distribution of payoffs from an action, affects the willingness of individuals to take on risk (see section on taxation and risk taking). Thus, incidence in an uncertain world would differ from that in an environment of certainty. If the standard two-sector model is altered, for example, by introducing technological uncertainty into one sector, the functional incidence of a variety of taxes would depend on attitudes toward risk.²¹ To indicate the nature of the results, consider the case of the replacement of a general income tax by an equal yield broad-based sales tax. In a certain world, these taxes are equivalent. In an uncertain world, however, the substitution of taxes makes the more intensive factor in the uncertain industry better off when absolute risk aversion is decreasing. Similarly, with certainty, an excise tax on a good is equivalent in its effects to a partial factor tax on both inputs into that good. With uncertainty and risk aversion, the more intensive factor gains from the replacement of partial factor taxes by an equal rate commodity tax on the uncertain sector.

- *Endogenously determined aggregate factor supplies.* It has been assumed that the aggregate supplies of the two factors, capital and labor, are fixed to the economy. Clearly, however, these are endogenous in the long run, determined by labor supply and human capital investment decisions, and saving decisions of households. Feldstein (1974) extended the analysis of the incidence of a tax on capital in a growing economy by assuming that the supply of capital is determined in the long run by the savings behavior of households in the economy. He showed that if saving is depressed by the lower after-tax return on capital, the long-run burden of the tax may be shifted to labor due to the reduced capital-labor ratio in the economy. In fact, in a central case, the tax is completely shifted to labor, as the capital stock falls sufficiently to restore the after-tax return to capital to its pretax level.

The functional incidence of the corporate income tax

The incidence of the corporate income tax is among the most researched of tax incidence questions. It is with this tax that the distinction between statutory and economic incidence is most apparent: the company itself remits the tax to the government, but it could be

the owners of the firm, its workers, its customers, capital owners in general, or workers in general, or some combination, that actually carry the burden. An important advance in the analysis of the tax was made by Harberger (1962), who enunciated the two-sector model described previously. He divided the entire economy into two sectors—the corporate sector and the noncorporate sector (mainly unincorporated, professional and self-employed businesses, and housing). Both sectors employ capital and labor to produce their output, and factors are mobile between sectors. The corporate income tax is then interpreted as a tax on the return to capital employed in the corporate sector, that is, it is a partial factor tax in the terminology of this chapter.

To determine the incidence of the tax, the model was parameterized to accord roughly with the U.S. economy of the 1950s. Harberger found that for several reasonable sets of demand and factor substitution elasticities, the corporate income tax was not shifted, but was fully borne by the owners of capital. Similar results have been derived for a variety of developed countries.

The two-sector model has also been applied to analyze the incidence of corporate taxation in developing countries. An application of the two-sector general equilibrium model to corporate taxation in India partially reversed previous empirical results for that country by showing that the tax is not completely shifted to labor and consumers, but is borne in part by capital owners.²² The corporate income tax is also an important revenue source in many east Asian economies, providing a share of total tax revenue approximately as large as in several developed countries. Using the best available estimates of elasticities of demand and factor substitution, general equilibrium incidence calculations for these countries have indicated that in two central cases, capital bears almost all or more than all of the tax, depending on the value of the elasticity of substitution in the noncorporate sector.²³

Subsequent analysis has addressed a number of problems with Harberger's approach. Shoven and Whalley (1972) solved numerically for the general equilibrium of a more disaggregated model of the economy than Harberger used, adding more sectors, but found that his incidence result was approximately maintained. Another criticism has brought out the importance of firms' financial structure for the incidence of the tax. Some have questioned the assumption that the corporate tax was correctly modeled as a tax on the use of capital in the corporate sector. Specifically,

²¹See Ratti and Shome (1977b).

²²See Shome (1978).

²³See Shome (1985).

since under most tax systems, interest expense is deductible in determining the tax base, only equity financed capital is taxed (see section on corporate income tax). In this case, since the marginal investment can always be financed with debt, the corporate tax does not change the cost of capital, and does not lead to the resource reallocations analyzed by Harberger. Thus, the tax falls solely on corporate rents and is borne by the claimants of those rents rather than by capital owners.

Relatedly, it is worth noting that the incidence of the corporate tax depends on other specific provisions of the tax law. For example, corporate tax codes often allow investment tax credits and other incentives to investment. Some tax reforms, for example, the 1986 corporate tax reform in the United States, have reduced the investment tax credit at the same time that the corporate tax rate was reduced. Because this package of changes has offsetting effects on the taxation of capital, the net effect is that there is no change in the effective tax rate to new investment in the corporate sector, so that the output and factor substitution effects do not arise on account of the tax reform. In this case, the only effect is that the tax burden has decreased on previously invested corporate capital, on account of the reduction in the corporate tax rate. Since previous investments cannot be reversed, owners of this capital at the time the tax becomes apparent are the beneficiaries of the tax reform. This benefit would become capitalized into the value of their ownership claims.

The incidence of preferential tax treatment of investments in targeted industries

By altering the perspective in the analysis of a partial factor tax above, we can gain some insight on the incidence of policies that give preferential treatment to investment in particular industries. Consider the untaxed sector in the model of the incidence of a partial factor tax. It is favored relative to the taxed sector; that is, it is as if investment in this sector is subsidized. Examples would include land, real estate, and household durables, as well as investment in certain favored manufacturing industries. What is the "functional incidence" of this preferential treatment? Clearly, that depends on the magnitudes of output and factor substitution effects. From the analysis above, it can be seen that to the extent that capital owners benefit, capital owners in all industries benefit. Similarly, it is not impossible for labor to benefit from the subsidy to capital.

Open-economy considerations

New considerations arise if the economy under study is open to international trade and international capital movements. First, if the country is small, in that

it cannot influence by its choices the world prices of tradeables, including the price of internationally mobile capital, then capital cannot bear any of the burden of a tax on capital, whether levied on all uses or only on some uses of capital. This is because the supply of capital to the economy is perfectly elastic. Second, when a country attracts foreign investment, the home country of the investor may offer a tax credit for taxes paid by its resident firms to host country governments. In this case, host country taxes do not alter the cost of capital at the margin to the firm and have no effect on investment. The tax levied on foreign-controlled companies are effectively paid by residents of the home country, through a transfer from the home to the host treasury, at least up to the limit of creditability. Third, if the country imposing the tax is large, in that it can affect world prices, it has the ability to export part of the burden of domestic taxes by altering through its tax policy the terms of trade in its favor.

Judgmental Studies of the Incidence of the Tax System

The approach

There have been a number of major studies of the distributive impact of the tax system.²⁴ These studies begin with a distribution of annual family income by ranges, and then allocate taxes paid under each of the major taxes to each of these income groups, relying on what seem reasonable assumptions (judgments) regarding the incidence of the taxes. The allocations of tax depend on available data on patterns of the distribution of types of income by income group, in particular the distribution of labor income, components of capital income (for example, dividends and interest income), and transfer income. Data on consumption patterns by income group (obtained, for example, through surveys of consumer expenditure) are also used to allocate tax burdens that are judged to be borne by families as consumers. The effective tax rate of each income group is then determined as the ratio of the taxes deemed paid by that group to the income allocated to that group. Using these calculations, the studies permit a judgment about whether the burden distribution of the tax system is progressive, proportional, or regressive.

²⁴For the United States, see Pechman and Okner (1974) and Musgrave, Case, and Leonard (1974). Similar studies have been carried out for other countries. In the United Kingdom, the Central Statistical Office publishes results annually in *Economic Trends*. Studies for other countries include Dodge (1975) and Gillespie (1976) for Canada; Cazenave and Morrisson (1974) for France; and Franzén, Lövgren, and Rosenberg (1975) for Sweden. In developing countries, studies besides those already mentioned include Malik and Saqib (1989).

Shifting assumptions

The incidence calculations focus on five key taxes: personal income, corporate, sales and excise, property, and payroll. The taxes under each of these are assumed to be paid in some combination by consumers and factor suppliers, based on judgments of demand and supply elasticities and on other factors. The personal income tax is usually treated as paid by income recipients, and is progressive due to increasing average tax rates. Labor income itself is observed to be more or less proportionally distributed throughout income classes, so that a proportional payroll tax is regressive due to the ceiling on contributions (see Chapter IV). A variety of assumptions characterize the treatment of taxes on capital income, with different assumptions leading to different burden distribution estimates. Corporate taxes are regressive if judged to be shifted forward to consumers, on account of the observed declining propensity to consume with income, but progressive if assumed to be paid by recipients of dividends or alternatively by all recipients of capital income, which is heavily concentrated in the upper tail of the income distribution (although it is also an important income source at the bottom of the distribution because of pension income). Intermediate positions are also considered, with the tax split between consumers and capital income recipients. The residential and commercial property tax is progressive if paid by capital recipients, but less so if split among capital recipients and consumers, including consumers of the services of residential capital. Using similar reasoning, sales and excise taxes are regressive if borne by consumers, and progressive if borne by recipients of factor incomes used in production of the taxed good, as well as the pattern of exemptions and incentives.

The proportionality hypothesis

Statistical exercises such as the judgmental studies are useful in giving a broad view of the shape of the tax system. The studies suggest that the total tax burden is close to being proportionally distributed, and definitely less progressive than an analysis of the tax law would suggest. Thus, annually, the tax system by itself changes the distribution of income in the economy to an imperceptible degree, except perhaps at the two extremes of the income distribution. This "proportionality hypothesis" is the consequence of the progressivity of income taxes being offset by regressivity in sales and excise taxes, and payroll taxes.

Limitations of the approach

The strength of the judgmental approach is its detail and the relatively high quality of the data. While stud-

ies of this form offer useful insights into the incidence of the tax system, the following three shortcomings should be kept in mind.

- *Implicit modeling of the working of the economy.* The results are sensitive to shifting assumptions. Reasonable variations in judgments on incidence of particular taxes can lead to different estimates of the distribution of the burden of the entire tax system, appearing either sharply progressive or regressive.²⁵ For example, since much of the progressivity in these studies arises from the taxation of capital, greater regressivity can be achieved by assuming that a greater share of the taxes levied on capital are shifted.

- *Lack of general equilibrium interactions.* Related to the first point above, judgmental studies lack fully articulated behavioral responses by households. While data on household behavior in the presence of the current tax system is available, such data are unavailable in the absence of the taxes. One cannot correctly judge the impact of the tax without knowing the behavioral responses of the economy's participants. Nevertheless, the studies for the most part assume that relative producer prices are constant and that there is no behavioral response by households, and calculate tax burdens accordingly.²⁶

- *Problems in measuring income.* In these studies, a hypothetical, or "counterfactual" before-tax position must be specified, to be compared with the observed posttax position. The incidence results are sensitive not only to the shifting assumptions chosen, as indicated above, but also to the hypothetical income position chosen. Several problems arise.²⁷ The most important shortcoming relates to the studies presenting a point-in-time picture of the effect of taxes, a snapshot of incidence for a particular year. Using annual income at a point in time as a measure of the position of a household in the income distribution ignores that there is significant mobility across the income distribution through the life cycle of a household; that is, a given household would show up in different income classes at different times. Under these conditions, ultimate interest should lie in the longer-term tax burden of households, which relates to the whole path of tax burdens over the life cycle.

Lifetime tax incidence is the appropriate concept to examine. This shift in perspective may have a significant effect on the conclusions about the progressivity or regressivity of the tax system. For example, payroll taxes that finance social security measured at a point in

²⁵See Whalley (1984).

²⁶See Meerman and Shome (1980).

²⁷See Meerman and Shome (1980); Whalley (1984).

time indicate substantial redistribution from the relatively higher-income working population toward the lower-income retired population. However, in lifetime terms, there may be no redistribution, as tax payments during employment are repaid as social security benefits. Similarly, estimates of the incidence of consumption taxes may be greatly altered when a lifetime perspective is adopted. For most countries, consumption as a proportion of income varies much less in life-cycle terms than on annual terms. Then consumption taxes that appear regressive from the annual viewpoint would appear less regressive if measured over the lifetime. Under these circumstances, annual consumption may provide a more accurate proxy for lifetime income than does annual income. Thus, the result of Shome (1986) that the domestic indirect consumption tax system in Bangkok is more progressive with respect to annual consumption than with respect to annual income can be interpreted to mean that the indirect tax system is more progressive when measured relative to lifetime income.

Computable General Equilibrium Models of Tax Incidence

The next innovation, which is still evolving, in the calculation of the distribution of tax burdens consists of constructing and simulating a complete general equilibrium model that reflects the observed structure of the economy.²⁹ This model is then made to respond to the introduction of particular taxes, and the resulting changes in households' positions are observed. The major advantage relative to the Harberger analysis and related empirical work is the ability of the approach to derive empirical results at a much greater level of disaggregation. The introduction of more than two sectors and factors allows a wider number of interactions to be examined. Similarly, a number of household types can be introduced to more closely match the distribution that prevails in the economy under study. In addition, the approach can yield the exact impact of taxation at finite rates (and not extrapolations of results derived from linearizations and infinitesimally small taxes). For

the same reason, the approach allows an estimation of the distribution of the deadweight loss of the tax system in addition to the distribution of the direct tax burden. The advantage of the approach relative to the judgmental studies discussed in the previous section arises from replacing implicit modeling assumptions with explicit assumptions on values of important parameters. That is, judgments about forward or backward shifting for any tax are replaced by a fully specified general equilibrium model through which the full implications of assumptions can be traced.²⁹

Most of the applied work in this area has been for developed countries. Early work focused on the incidence of the corporate income tax, where Harberger's casual result that capital bears the full burden of the tax was confirmed in a more complex model,³⁰ allowing a greater number of substitutions. Other empirical work has investigated incidence of the entire tax system, incidence in an open economy environment, lifetime tax incidence, capital allocation, and risk. Future developments of numerical general equilibrium analysis, for both developing countries and developed countries, will incorporate more complete modeling of intertemporal substitutions and intergenerational effects, and risk; a more careful modeling of effective tax rates, taking into account the detailed provisions of the tax law; a richer structure of the financial sector, capturing interasset substitutions; greater detail on the consumption side, allowing for more types of household groups; modeling of incomplete markets, unemployment, and other market imperfections; and an expanded scope for sensitivity analysis of the results. Thus, these models capture a wide variety of interactions among different markets. The models, however, still require improvement in their treatment of intertemporal issues, different market structures, foreign trade, public expenditures, and the detailed provisions of the taxes under study.³¹

²⁹The results of Devarajan, Fullerton, and Musgrave (1980) suggest that the results of the judgmental studies are fairly close to those of the conventional general equilibrium simulations.

³⁰See Shoven and Whalley (1972).

³¹See Whalley (1988) for an assessment of the contribution of these models.

²⁸For a recent survey, see Whalley (1988).

Static Versus Intertemporal Effects of Taxation

JULIO ESCOLANO

- *What do we gain from considering a time dimension in the analysis of tax policy?*
- *Does the timing of tax burden matter?*
- *What are the intertemporal effects of taxes on income?*
- *Can tax policy increase the rate of economic growth?*

The theory of public finance was developed within a static analytical framework, abstracting from the intertemporal consequences of government actions. Many issues in the theory of taxation can be successfully analyzed from a static standpoint, either because they are static in nature or because the insights gained carry over to a dynamic framework with only minor modifications. To name only one example, David Ricardo's analysis on the effect of tariffs on welfare was developed in terms of comparative statics. Still, it remains at the core of the current view on the subject. A static analysis is not necessarily inferior to a dynamic viewpoint.

Nevertheless, some issues in tax policy are intrinsically intertemporal. This is often the case when the problem at hand involves the effects of taxation on interest rates, savings, capital accumulation, or economic growth, among others. In these cases, a naive application of conventional wisdom, based on a static approach, may be misleading. Furthermore, there are cases in which the goal is not only to identify the final consequences of a given policy—which often can be accomplished with the tools of statics—but to assess the temporary effects of such policy and to determine the path of the relevant economic aggregates during the transition between the present and final states of the economy. To tackle those problems, it is necessary to consider explicitly economic interactions that take place over time. Thus, for example, an inefficient tax may initially increase revenue at the expense of a subsequent reduction in savings and investment, causing a slowdown in economic growth and, ultimately, in revenue.

Dynamic considerations have always been an important part of economic analysis and policy design. The development of theories of economic growth³² and general equilibrium³³ expanded the scope of available tools and

fostered more rigorous and quantifiable evaluations of the dynamic consequences of tax policies. Recent developments in the theory of endogenous growth have further expanded these possibilities. The intertemporal approach emphasizes connections between present and future tax and fiscal measures and between expectations of future events and present behavior of households. These interrelations may be essential to the analysis of tax policies and would go unnoticed under a static analysis. The present section covers a few selected topics in the dynamic analysis of tax policies. Since the dynamic approach currently pervades virtually all areas of the theory of public finance, no attempt at exhaustive coverage is made here. Yet, the issues included here have important tax policy implications by themselves and illustrate the potential of an intertemporal approach.

Timing of Taxes and Ricardian Equivalence

A frequent topic of policy interest is the effectiveness of temporary tax cuts in increasing output and reducing unemployment. According to the traditional static approach, the substitution of tax revenue by government debt would, on the one hand, stimulate the economy by making households feel wealthier. On the other hand, public debt would compete with private investors for loanable funds, driving interest rates upward and crowding out private investment. Although, under the incentive of higher interest rates, households would save more than before, the total amount of domestic savings—that is, private savings less public deficit³⁴—would be lower. Moreover, the decrease in total domestic savings—public and private—would be matched by a corresponding imbalance in the external sector.

When the same policy problem is recast in a dynamic framework, the possible outcomes and underly-

³⁴For a strict interpretation of the concept of public dissaving, the relevant deficit is the current public deficit—current expenditure less current revenue. Correspondingly, the deficit of the capital budget should be considered part of total domestic investment. Under a static point of view, whether the capital budget deficit is classified as investment or negative saving does not alter its effects on private investment and interest rates. In a dynamic framework, in contrast, public investment may expand the growth potential of the economy. From this point of view, whether the public deficit corresponds to a current or capital deficit is not just a definitional issue but a distinction between two policies with very different long-run implications.

³²See Solow (1956 and 1970).

³³See Debreu (1959).

ing forces may be very different. A tax reduction without a corresponding cut in government expenditures means an intertemporal rearrangement in the timing of the tax burden while holding constant its discounted present value. Thus, a current tax cut implies an increase in future taxes with a discounted present value equal to the newly issued debt. The economy's reaction to this policy will depend on the way households anticipate the higher future tax burden and on the form in which they will be affected by it. During the last 15 years, economist R.J. Barro³⁵ has revived an old theory, first proposed by David Ricardo, called Ricardian equivalence. According to this view, a current tax cut financed by government debt has no real effects and does not change either the present or the future path of the economy. Rational agents, anticipating higher future tax liabilities (needed to service the debt) with a discounted present value equal to the current increase in their wealth induced by the tax cut, will proceed as if the debt and the tax cut had never taken place. They will match the debt issue with an increase in their savings, financed with the tax cut, to face anticipated future taxes. Consequently, interest rates, private investment, consumption, and the balance of payments will remain unchanged.

There is very little doubt that the necessary conditions for Barro's theory are far too restrictive for this theory to hold in all circumstances. Nevertheless, despite its near certain invalidity as a literal description of the role of public debt, Ricardian equivalence seems to approximate the actual behavior of the economy in many instances.³⁶ Empirical studies are still inconclusive about the theory as a whole, but there is already enough factual evidence to infer that the effect that it predicts is an integral part of the reaction of the economy to increases in public debt and changes in the timing of taxation. The intensity of Ricardian equivalence effects will depend on a number of factors, some of which are mentioned below.

A first factor is the planning horizon of economic agents. According to the life-cycle hypothesis, individuals save during the first part of their life to finance their retirement and dissave during the second part of their life.³⁷ If this is the main motive for private savings, a current tax cut financed by public debt that will be repaid with taxes far into the future does have real effects and Ricardian equivalence breaks down. The

policy effectively transfers income from future generations—which will pay the taxes needed to redeem the debt—to current generations. The lifetime income of current generations is increased by the amount of the tax cut. Only a portion of this increase will be saved. Thus, the increase in private savings predicted by Ricardo will not be enough to absorb the issue of debt, which equals the tax cut, and public debt will tend to crowd out private investment. As a result, subsequent generations will inherit a lower stock of capital, and higher debt and interest rates.

In contrast, if there are altruistic intergenerational links and the desire to leave bequests is the main motive for private savings, Ricardian equivalence effects will be stronger. In this case, the relevant economic agent is not only the individual but also includes his progeny. Owing to altruistic intergenerational links, anticipated future tax increases will prompt current savings with the same discounted present value. As a consequence, increased individual savings will sterilize the effects of debt-financed tax cuts, as predicted by the Ricardian equivalence theory.

A second factor is the existence of liquidity constraints. Households are liquidity constrained if they would like to borrow to enjoy a higher level of current consumption at the expense of their future income but, owing to constraints in the credit markets, are unable to do so. If some households are, in fact, liquidity constrained, a tax cut will increase their present consumption. The policy allows them to sidestep the constraint they face in the credit market by spending the tax cut in higher present consumption and paying higher taxes in the future. From the point of view of the liquidity constrained households, the government, when issuing debt to finance the tax cut, is borrowing on their behalf. Thus, a tax cut financed by issuing government debt will have real effects, in opposition to the Ricardian equivalence theory.

Finally, a third factor that makes debt financing non-neutral, in opposition to the Ricardian equivalence, is the existence of distortions created by taxation. Changes in outstanding government debt can be expected to change the timing and level of average and marginal tax rates, thereby increasing or reducing the overall efficiency loss. A concentration of the tax burden in any particular period will increase the inefficiencies created by distortionary taxation. It is known, for example, that under most conditions, intertemporal tax smoothing minimizes the efficiency loss. This is because the efficiency loss grows more than proportionally with the tax rate. A current tax cut financed by future increases in taxes may decrease present efficiency losses at the expense of creating higher ineffi-

³⁵See Barro (1974).

³⁶A current survey of empirical and theoretical evidence for and against the Ricardian equivalence hypothesis can be found in Seater (1993). Another comprehensive survey on this topic is found in Bernheim (1987).

³⁷See Shome and Squire (1983).

ciencies in the future, with the effect of increasing the overall efficiency losses in the economy. Thus, the policy under consideration will alter the future path of the economy and Ricardian equivalence will not hold.

Debt and Inflation Financing

Changes in the timing of the "inflation tax" can be subject to a dynamic analysis similar to that used to evaluate the effect of debt financing.³⁸ This analysis would primarily apply to countries where money creation plays an important role in financing the fiscal deficit.

The government may attempt to reduce inflation by switching from inflation to debt financing without reducing the fiscal deficit, that is, by maintaining the current and prospective values of its real expenditures and tax receipts. In this case, the decrease in seignorage financing must correspond to the increase in government debt. This decrease in the growth rate of the money supply, however, is not sustainable. Since the time paths of real tax revenue and expenditure are left unchanged, future debt service will have to be financed by resorting eventually to money creation. In other words, the government is just rearranging the timing of increases in the money supply.

Under these conditions, the current contractionary policy will have no effect on the long-run rate of inflation. In fact, due to the anticipation of future increases in the money supply, it is likely that the policy will fail to reduce inflation significantly even in the short run. The initial slowdown in the money supply will possibly be matched by a parallel shift downward in the demand of money—or an increase in its velocity of circulation—leaving current and future inflation rates essentially unchanged. Therefore, a plan to curb inflation, even temporarily, will be unsuccessful unless it comprises a permanent real reduction of the fiscal deficit.

Taxes on Capital Income and Private Savings

The traditional view on the effects of capital income taxation on savings was based, in the 1950s and 1960s, on the Keynesian static model of consumption demand. In the best-known version of this model, individuals save and consume constant fractions of any increase in their after-tax income (constant marginal propensity to consume).³⁹ As a consequence, returns to

capital were predominantly treated as rent. That is, the taxation of capital income was not considered to have consequences on the allocation of resources, and the stock of capital could be taken as approximately fixed. Since intertemporal substitution effects were not taken into the analysis, taxation of capital appeared optimal.

This viewpoint came to be increasingly challenged in the 1970s. Feldstein (1978) and Boskin (1978) argued that the tax treatment of capital income had major effects on accumulation and growth. Boskin (1978) and others pursued the issue empirically and showed that savings were not inelastic with respect to the interest rate. It became clear that changes in the after-tax interest rate, prompted by capital income taxation, could have important dynamic effects, and that savings could not be represented as a stable function of the contemporaneous return on capital.⁴⁰

Recently, many economists have studied the effect of capital income taxation on savings, capital accumulation, and welfare in an intertemporal framework.⁴¹ Empirical evidence as well as analytical considerations point to a larger welfare cost of capital taxation than had previously been thought.

One objective of current savings is to increase future consumption. If successive generations are related by altruistic links, and bequeathing is an important motive for saving, the deferral of consumption can extend far into the future. Under these conditions, current savings will depend on the relation between the price of current consumption and a long sequence of prices of possible future consumptions. The relative price between future and present consumption is the amount of consumption that would be attainable on a future date by forgoing one unit of consumption today. Therefore, this relative price between consumption on any given future date and current consumption is the result of compounding the successive interest rates corresponding to the years in between.

A tax on capital returns creates a wedge between the pretax and after-tax return rates lowering the after-tax interest rate. Consequently, after the introduction of a tax on capital income, forgoing one unit of current consumption affords a lower amount of future consumption; that is, future consumption becomes more expensive in terms of present consumption. The tax-induced distortion of relative prices becomes larger the farther into the future is the intended consumption that motivates current savings. This is due to the compounded effect of many periods of reduced interest

³⁸See Sargent and Wallace (1981).

³⁹This is the case, for example, in Solow (1956). More sophisticated versions incorporated the influence of present wealth, current interest rates and, occasionally, lagged values of some variables.

⁴⁰See also Tanzi (1991).

⁴¹See, for example, Summers (1981 and 1984), Auerbach and Kotlikoff (1987), and Lucas (1990), among others.

rates. Thus, a tax on capital income discourages long-term saving more than short-term saving.

The short-term supply of capital may be relatively inelastic to changes in the after-tax rate of return, as postulated by static analyses. The supply of capital in future years, however, is indeed increasingly elastic with respect to permanent changes in after-tax returns. This is due to the accumulated effect that period after period of lower savings have on the stock of capital of an economy.⁴² Since at least part of the growth in productivity is achieved through the introduction of technological changes embodied in new capital goods, high taxes on capital may prompt a slowdown in productivity, hinder economic growth, and ultimately cause a lower level of both savings and consumption.

Taxation, Human Capital Accumulation, and Economic Growth

The classical theory of economic growth was primarily concerned with the accumulation of physical capital. Technological change, human capital accumulation, and other growth-inducing factors, although analyzed, were generally considered beyond the reach of economic policies.⁴³ The new theory of growth, which has been developed in recent years, focuses on those factors that can produce long-term increases in the growth rate of an economy. Much attention has been paid to the study of ways in which the economic environment and government policies affect the rate of human capital accumulation. Although it is still early for conclusive results, these recent studies shed new light on the effect of taxation on the long-term growth prospects of an economy.⁴⁴

Income taxation affects the accumulation of human capital in many ways. The taxation of capital income reduces the net rate of return on physical capital and makes human capital a relatively more attractive investment. Capital taxation causes savings to fall, thus reducing physical capital over time. As a result, the wage rate will tend to decrease owing to the relative abundance of labor vis-à-vis physical capital. Future lower wages imply a lower return to the current investment in human capital. These two effects operate in opposite directions and therefore, from purely analytical

grounds, the consequences of capital income taxation on human capital accumulation are ambiguous.

If the primary input in the accumulation of human capital is time, its main cost will be forgone wages during the time necessary to acquire human capital. This cost may take the form of longer schooling or a higher age when entering the labor market. Thus, the taxation of labor income, by lowering wages, reduces the cost of investing in human capital. It also reduces, however, the future return to current human capital investment, that is, future wages, in the same proportion. In other words, labor taxation lowers both the return and the cost of human capital by the same proportion.

The taxation of labor income also has a negative effect on human capital through general equilibrium effects. A tax on wages will permanently reduce the supply of labor⁴⁵ and thus, the rate of utilization of human capital. This utilization effect is also produced by capital income taxation through the lower capital-labor ratio and the corresponding decrease in wages that it causes in the long run.

Nevertheless, time is not the only input in human capital accumulation. Physical capital or past investments of society in the form of infrastructure—schools, universities, laboratories—are necessary for the efficient accumulation of human capital. Thus, taxation of capital income, by reducing the available physical capital, can limit the ability to accumulate human capital.

Quantitative and statistical studies tend to confirm the positive role that human capital plays in economic growth.⁴⁶ They also indicate that the overall effect of taxation of either capital or labor income can substantially hamper human capital accumulation.⁴⁷ Consequently, from the point of view of development and growth, consumption taxation seems preferable to income taxation. Consumption taxation does not alter the relative price of consumption between different dates, and therefore it is neutral with respect to the intertemporal allocation of resources. Moreover, it encourages the accumulation of human and physical capital by reducing their relative cost—their price in terms of consumption. As a result, it has the potential to increase, relative to other forms of taxation, the long-term stock of productive resources of an economy and its growth rate.

⁴²Empirical evidence of the high correlation between domestic savings and domestic investment, even in open economies with international capital flows, can be found in Feldstein and Bacchetta (1989).

⁴³See Solow (1956 and 1970).

⁴⁴Some recent analyses that pay particular attention to the relation between taxation and growth are Barro and Sala-i-Martin (1990), King and Rebelo (1990), Lucas (1990), Jones, Manuelli, and Rossi (1993), and Trostel (1993).

⁴⁵The effect discussed assumes an upward sloping supply of labor in the long run.

⁴⁶See Knight, Loayza, and Villanueva (1993) for recent evidence and an assessment of other studies.

⁴⁷See King and Rebelo (1990), Rebelo (1991), and Trostel (1993).

Taxing Consumption/Expenditure Versus Taxing Income

JULIO ESCOLANO

- *What is a personal expenditure tax?*
- *Is an expenditure tax more efficient than an income tax?*
- *What are the equity implications of an expenditure tax?*
- *Is an expenditure tax equivalent to a payroll tax?*
- *How could an expenditure tax be implemented?*

The possibility of a direct tax on personal consumption expenditures has attracted the attention of many economists, at least since John Stuart Mill. Almost always, it has been proposed as an alternative to income taxation or, more specifically, as a substitute for the personal income tax.⁴⁸ The critical difference between the "expenditure" or "personal cash-flow" tax and the more conventional income tax is that the former exempts that part of personal income which is saved (i.e., invested). Since income is either saved or consumed, the expenditure tax falls on consumption, which is determined by subtraction. Unlike indirect consumption taxes, such as the VAT or sales taxes, the expenditure tax is a personal tax. Therefore, tax liability can be tailored to the economic circumstances of the taxpayer. In particular, a direct tax on personal consumption can be made progressive.

Until now, the expenditure tax has remained in the economists' drawing board with very few instances of practical implementation. Only India and Sri Lanka actually introduced an expenditure tax around 1960 under the advice of the economist Nicholas Kaldor and abandoned it shortly afterwards. Sri Lanka reintroduced the tax in 1976, but abandoned it once more in 1977. Both countries implemented the expenditure tax as a complement to the personal income tax. More recently, the possibility of adopting an expenditure tax has received attention in the United States,⁴⁹ the United Kingdom,⁵⁰ and Sweden.⁵¹ The widespread implementation and success of the VAT in many industrial and develop-

ing countries during the last decade has had a mixed impact on the perception of the expenditure tax by policymakers and economists. On the one hand, the popularity of the VAT has revived interest in consumption as a base for taxation. On the other hand, the versatility and achievements of indirect consumption taxes raise questions on the need for an additional tax instrument that targets the same macroeconomic aggregate directly. It can be said that the future of direct consumption taxation will hinge on the shortcomings of income taxes as tools for income redistribution, rather than on the relative advantages of consumption as a base for taxation.

Why an Expenditure Tax?

Efficiency and neutrality

Economic efficiency is commonly regarded as one of the main advantages of a consumption tax vis-à-vis an income tax. The difference between the two taxes arises from the "double taxation" to which investment returns are subjected by the income tax. Under a conventional income tax, income is taxed first when it is originally earned. Additionally, if a portion of that income is saved for later consumption, the return on savings will be taxed each year, effectively reducing the interest rate received on savings. Therefore, given any amount of pre-tax income earmarked for savings, the income tax reduces the return that could be obtained from it in two different ways: (1) through the levy on the original earnings, it diminishes the amount of funds initially available for saving; and (2) through subsequent levies applied on the income from savings when it accrues, the income tax lowers the yield obtained from any initial amount of savings. The first effect would, by itself, reduce the future flow of income in proportion to the tax rate by reducing the amount originally saved. The second effect reduces the future income flow further by lowering the after-tax interest rate.

These two effects reinforce each other when there is a long lag between the original saving decision and the eventual consumption of the proceeds. This is because the combined effect of many periods of lower after-tax interest rates can amount to a substantial "wedge" between the compounded pretax and after-tax rates of return. The effect is particularly relevant because most household saving decisions are made for motives—

⁴⁸See W.D. Andrews, "A Supplemental Personal Expenditure Tax," in Pechman (1980) for a defense of the expenditure tax as a complement to income taxation.

⁴⁹See U.S. Department of the Treasury (1977).

⁵⁰See Institute for Fiscal Studies (1978).

⁵¹See Swedish Government Commission on Taxation (1978).

such as bequests, retirement, eventual medical expenses, etc.—that involve long-term deferral of consumption. For example, if the pretax annual interest rate on savings is 10 percent and the income tax rate is 30 percent, the one-year after-tax return will be 7 percent (30 percent lower than the corresponding pretax return). Under the same assumptions regarding interest and tax rates, however, the 20-year after-tax compounded interest rate is 50 percent lower than the corresponding pretax rate. Summarizing, the income tax reduces the amount of income available to allocate consumption among different dates, and it also penalizes at increasing rates the allocation of consumption to future dates.

Both income and consumption taxes reduce the flow of consumption that can be attained with any given lifetime income,⁵² thus lowering real income. The consumption tax reduces real income by increasing the price of any given amount of consumption by the extent of the tax liability. The income tax does that by directly taxing away a portion of earnings. Moreover, an income tax alters the relative price of future consumption with respect to present consumption by decreasing the after-tax interest rate. That is, the income tax makes it necessary to forgo more present consumption to obtain any given future consumption. In contrast, a consumption tax is neutral with respect to the intertemporal allocation of consumption because it taxes consumption expenditures independently of their timing.⁵³ In particular, a consumption tax does not create a wedge between the pretax and after-tax interest rates and therefore, deferral of consumption (i.e., saving) is not penalized.

Although all taxes distort prices, thereby prompting a loss in efficiency, the specific distortion which income taxes introduce is generally considered particularly damaging. By penalizing savings and placing an even heavier handicap on long-term saving, income taxation might permanently reduce the amount of funds available for productive investment in an economy. Lower saving and investment rates will, in turn,

hamper economic growth. Consumption taxation, on the other hand, can be expected not to have a similar negative effect. First, consumption taxes do not reduce after-tax interest rates and thus, they do not create a disincentive to save. Second, consumption taxes lower the price of investment goods relative to consumption goods. Consequently, whereas the distortions introduced by an income tax are biased against savings and investment, the opposite is true of the distortions introduced by a consumption tax.

Equity

Perhaps the most controversial issues concerning the choice of consumption as a base for direct taxation are related to its equity implications. The fundamental question is whether the tax burden should be distributed across individuals according to their ability to pay or according to the degree in which they make use of the output of society. Proponents of the income tax rely on the Haig-Simons definition of income as accretion of power to consume. According to this view, income, which by definition implies capacity to pay, should be the criterion for taxation. In contrast, proponents of the expenditure tax follow Hobbes' assertion that it is fairer to tax an individual according to what he takes from the common pool (consumption), rather than according to what he contributes to it (income). This view relies on the consideration that factors of production are remunerated in proportion to their marginal productivities. Thus, total income measures the economic value of the resources that constitute the contribution of an individual to society. Higher income indicates a contribution with higher economic value while higher consumption reveals a more intense use of goods and services provided by society. Reaching a verdict on the correct criterion for the distribution of tax burden is perhaps, ultimately, beyond the purview of economics. At most, economic analysis can clarify the implications of different choices.

Neither income nor consumption taxes can accurately target, in practice, their intended bases. The sources of income that can be taxed are not a perfect indicator of the ability to pay. A complete inventory of the potential to contribute should include the use of time and productive resources in leisure and other nonmarket activities. Since these resources could have been employed in remunerated activities, they are part of an individual's ability to pay. Similarly, direct use of time and resources directly owned by the consumer cannot always be effectively taxed by a consumption tax.

Another problem concerns the treatment of gifts and bequests under an expenditure tax. If they are re-

⁵²The lifetime income is the discounted present value of the stream of present and future income flows of an economic agent.

⁵³It is worth noting that a direct tax on annual consumption with a progressive rate schedule can distort the intertemporal allocation of consumption. Progressive tax rates on annual consumption expenditure would encourage consumption smoothing across years in order to avoid higher tax rate brackets. This effect, however, is due to the disparity between the annual character of the tax base and the longer horizon of consumption-saving decisions. If the tax base were the present value of lifetime consumption instead of annual consumption, the incentive to smooth consumption expenditure across years to avoid higher tax rate brackets would disappear. A similar effect also occurs under an annual income tax with progressive rate structure, which creates an incentive for income smoothing.

garded as consumption of the donor, they should add to the donor's tax liability. Alternatively, since the mere transfer of property does not reduce the amount of goods and services available, bequests and gifts could be considered exempt from tax implications. The first treatment would be consistent with an individualistic definition of the unit of taxation. The second treatment could be based on the choice of the dynasty as the subject of taxation.

It has often been argued that, from a lifetime perspective, an expenditure tax is equivalent to a payroll tax. Therefore, it is claimed that an expenditure tax would place an unduly heavy burden on wage earners. Nevertheless, this equivalence only holds under very restrictive conditions. These conditions are that there be no initial wealth when the expenditure tax is introduced, that no one be allowed to bequeath wealth in the future, and that neither tax have a progressive rate structure. Under these conditions, the only primary source of lifetime income for an individual is labor, and all income must eventually be spent in consumption. Thus, the discounted present value of expenditures has to be equal to the discounted present value of labor income. Yet, if the existence of an initial stock of wealth is taken into account, an expenditure tax is, in fact, equivalent to a one-time levy on initial wealth combined with a payroll tax. Moreover, when gifts and bequests are taxed as consumption, the initial levy on existing wealth is repeated each time wealth is transferred. Finally, if tax rates are progressive, the discounted present value of tax liabilities will depend on the distribution of consumption across time. If consumption is concentrated in some periods, it will generally create a higher total tax liability than if it is evenly distributed across time. Thus, in the presence of progressivity, the equivalence between consumption and labor taxes—even if they have the same rate structure—will not hold if the time distribution of labor earnings differs from that of consumption expenditures. Therefore, when properly implemented, a consumption tax does not necessarily discriminate between labor and other sources of income.

Implementation of a Personal Consumption Tax

Different possibilities of implementing a direct tax on consumption have been proposed. The three tax models presented below represent proposals which have received attention from economists and policymakers. The first proposal is the personal expenditure tax, which would be similar to the conventional income tax but would allow a deduction for net deposits placed

in qualified savings or investment accounts. The second design allows intertemporal averaging of tax liabilities to target lifetime consumption. The third approach involves a payroll tax coupled with an enterprise cash-flow tax. This approach has a more ambitious objective since it is intended to replace the corporate income tax as well as the personal income tax.

Personal expenditure tax

This tax is also known as personal cash-flow tax. The idea underlying the expenditure tax is to measure consumption by subtracting net savings from income. Essentially, this involves aggregating all cash inflows such as wages, transfers, cash returns on past savings, and any dissaving (e.g., sales of property). From this total are deducted all outlays for the acquisition of qualified assets. Thus, under this method, consumption is measured by cash flow.

The treatment of savings and investment is the central feature that distinguishes this tax from a conventional income tax. Practical implementation requires the definition of qualified personal accounts, which should encompass any savings or investment that is intended to be excluded from the tax base. These accounts could be opened with stock brokers, banks, pension funds, etc. The treatment of these accounts for tax purposes would be conducted on a reverse cash-flow basis.⁵⁴ That is, any deposits would be tax deductible and any withdrawals would be taxable. The treatment of loans or other forms of credit would follow the same cash-flow principles. The drawing of a loan would be taxable and repayment of principal and interest would be tax deductible. Cash-flow accounting bypasses many practical problems of an accruals-based income tax. Thus, accrual of interest, dividends, and capital gains would not have direct tax implications. They would be considered as operations taking place within the accounts and would not need to be monitored by the tax administration.

Entrepreneurial income and unincorporated enterprises pose problems similar to those encountered under a conventional income tax. Nevertheless, their treatment might also follow the cash-flow method.⁵⁵ Net contributions to the business during the year

⁵⁴Under the personal consumption tax, the taxation of the operation of the qualifying accounts is the reverse of that under a standard cash-flow tax. Outflows (to the accounts) are deducted from the base while inflows (from the accounts) are included in the base.

⁵⁵As with the qualifying investment accounts, the taxation of cash flows between the business and the taxpayer is the reverse of that under a conventional enterprise cash-flow tax. Inflows (from the taxpayer to the business) are exempt while outflows (from the business to the taxpayer) are taxed.

would be deducted, whereas any cash received would be included in the tax base (see Chapter IV).

Another problem, shared with the income tax, is the definition of an adequate treatment of consumer durables, such as houses and automobiles. Ideally, a consistent treatment would call for an initial deduction of the amount initially spent in durables and subsequent inclusion in the base of the flow of services obtained from them. Nevertheless, owing to practical and administrative difficulties, a special treatment would probably have to be granted to expenditures in consumer durables. A possible approach is the tax-prepayment method. This means disallowing the deductibility of expenditures in durables, that is, treating them as current consumption. Correspondingly, the ulterior flow of consumption obtained from durables would not be taxed. In particular, if they were sold later, the proceeds of their sale would be exempted from tax.

If the expenditure tax has a progressive rate structure, however, special treatment would have to be accorded to exceptionally large expenditures in household durables. Financing the purchase of some durables, such as a house, usually involves a combination of loans and personal savings. Under an unmitigated cash-flow treatment, both sources would be fully included in the taxable base, which would result in an unusually high tax rate. Two methods could be used to alleviate this problem. The first method allows some form of intertemporal base averaging, such as carry-forward provisions. The second method is to accord also tax-prepayment treatment to the financing sources. Thus, in the case of selected loans, their undertaking would not create a tax liability and their servicing would not be deductible. Similarly, savings earmarked for selected purchases would not be deductible and withdrawals from those accounts would not be taxable.

The "Blueprints" cash-flow tax (BCT)

The proposal for this tax is contained in "Blueprints for Basic Tax Reform"⁵⁶ under "cash-flow tax." Its main difference with respect to the previously described expenditure tax is the extensive use that it makes of the tax-prepayment method. In the context of a cash-flow tax, using the tax-prepayment method of accounting for assets of any kind would generally be considered a flaw. Under the tax-prepayment method, the purchase of an asset is not a deductible expense and the subsequent stream of receipts generated by the asset—including returns and sale proceeds—are not taxable. Nevertheless, the BCT turns this inconsistency with cash-flow ac-

counting into a useful feature. By giving individuals a wide latitude to choose between standard cash-flow and tax-prepayment treatment of savings, the BCT allows intertemporal smoothing of tax liabilities.

Since the rate structure of the BCT is progressive, individuals will choose the cash-flow treatment of savings when their consumption expenditures are relatively high. Conversely, when taxable consumption expenditures are comparatively low, taxpayers will choose the tax-prepayment treatment of savings. A key characteristic of the system is that the deferral of tax liabilities can only be attained at a cost. When the taxpayer chooses tax-prepayment treatment of an asset, the tax base is the initial purchasing cost. When the method chosen by the taxpayer is the cash-flow treatment, however, tax liabilities will eventually be assessed on the consumption stream financed with the asset, which includes returns as well as principal. Therefore, the deferral of tax payments carries a cost given by the taxes paid on the yield of the asset. In this way, the base of the BCT is the discounted present value of the taxpayer's lifetime consumption. The BCT can be thought of as a program that imposes a progressive tax on the amount of wealth that an individual would need to fund his consumption for the rest of his life. By allowing intertemporal averaging of tax liabilities, the BCT is unaffected by differences in the patterns of lifetime earnings and consumption across taxpayers. Given two different time profiles of consumption with the same discounted present value, the BCT will tend to produce similar time profiles of tax payments.

Two-tiered cash-flow tax

This implementation was originally proposed by Hall and Rabushka (1983 and 1985) with a flat rate and has been later defended by Zodrow and McLure (1988) in a version with a progressive rate schedule. The principal feature of this tax is the simplicity of its administration. The system consists of two different taxes: (1) an individual tax on labor earnings that can be made progressive; and (2) a business cash-flow tax similar to an accounts-based VAT, but that allows the deduction of wages. The two-tiered cash-flow tax is meant to replace both the individual and corporate income taxes.

The base of the business tax is value added, calculated on a cash-flow basis, less payments to employees. This tier of the proposal is, therefore, similar to an R-based corporate cash-flow tax.⁵⁷ Alternatively, it can be seen as an accounts-based VAT with an additional deduction for payments to employees. The base of the other tier, the personal tax, is labor income. Thus, al-

⁵⁶See U.S. Department of the Treasury (1977).

⁵⁷See Chapter IV of this Handbook. A recent and exhaustive treatment of business taxation based on cash-flow can be found in Shome and Schutte (1993).

though payments to employees are deducted from the base of the business tax, they are taxed under the personal tax. The combination of these two taxes is, therefore, similar to a tax on consumption, such as a VAT.

Although this version of a consumption tax possesses clear advantages in terms of its simplicity and low adminis-

trative costs, its rationale has been undermined by the widespread success of invoice-based VATs. Moreover, the discriminatory treatment it accords to labor income would, most likely, be seen as unfair. Whereas labor income would possibly be taxed at progressive rates, consumption financed by other sources of personal income would have to be taxed through a flat rate.

Taxation and Risk Taking

RUSSELL KRELOVE

- *Does taxation of the return to a risky investment increase or decrease the amount of investment undertaken?*
- *How does the effect of taxation depend on the specific provisions of the tax law, including the provision for loss offsets, the progressivity of the rate structure, and whether the investment or the return to the investment is taxed?*
- *Why should private risk bearing be distinguished from social risk bearing?*

Profitability is in part compensation for bearing risk, so that a tax on the return from an undertaking taxes in addition the return from risk taking. There has long been a concern that the taxation of capital income leads to a reduction in risk taking. The concern arises from the belief that entrepreneurship is central to the development and growth of the economy, and that entrepreneurship involves risk taking in an essential way. If entrepreneurs are discouraged from undertaking new risky ventures, the growth rate would suffer.

In this section, we examine the effects of tax policy changes on the allocation of savings to risky assets.

- Taxing the return on risky assets can actually increase risk taking, if the tax system shares sufficiently in the risk of an investment as well as in the expected return. In particular, the provision under the tax law of full loss offsets will tend to increase risk taking.
- When loss offsets are partial, taxation may or may not decrease risk taking, depending on the relative strengths of income and substitution effects. Loss offsets are restricted under the tax system when losses from investments are not subsidized, or when losses cannot be completely carried forward at unchanged present value.
- Firms face two types of risk: income and capital. Even when there is effective full loss offset for income risk, tax systems as they are designed imply that government rarely shares completely in capital risk.
- When risky returns are taxed, so that the government is sharing in the risk, tax revenue is uncertain.

A distinction should be made between private risk and social risk.

In the following paragraphs, we consider a simple example of investment decisions in conditions of risk, and show how taxation of the return to the investment can increase risk taking. Late in this section, we also consider a number of limitations and extensions of this simple model.

The main message of this section is that taxation of risky returns can materially affect behavior. It follows that tax incidence in an uncertain world will differ from that in an environment of certainty. The effect of the presence of technological uncertainty in the standard two-sector model has been discussed above, in the section on general equilibrium tax incidence. Computable general equilibrium simulation analysis of the effect of taxation on portfolio choice in the United States has been undertaken in Slemrod (1983), and in Galper, Lucke, and Toder (1988). This type of research is at an early stage of development, but the empirical results do indicate that the treatment of risk can make a substantial difference to the estimated effects of taxes.

Proportional Taxation with Full Loss Offset⁵⁸

Suppose individuals make decisions about whether to invest in an asset based on two characteristics: the expected return on the asset and how risky that return is. Other things being equal, investors prefer assets that are expected to yield high returns. At the same time, investors are assumed to dislike risk; other things being equal, investors prefer safer assets.

Suppose there are two assets. The first yields a perfectly safe return. The second is a risky asset that has a positive expected rate of return greater than that on the safe asset. The investor can control the amount of risk he bears by choosing the amount to be invested in the risky asset. As the proportion increases, the risk borne increases, but the expected return on the portfolio also increases.

⁵⁸The demonstration is initially due to Domar and Musgrave (1944). The modern version of the argument is due to Mossin (1968) and Stiglitz (1969). Textbook treatments include Stiglitz (1988).

Now assume that a proportional tax is levied on the return to capital assets in excess of the risk-free rate.⁵⁹ Assume also that the tax allows for full loss offset—individuals can deduct all losses from other taxable income.⁶⁰ The tax lowers the expected rate of return to the risky asset, thus making it appear less attractive, compared to the safe asset. At the same time that the tax lowers the return, however, it lowers its riskiness as well. The government becomes in effect a partner in the investment. If the investment is successful, the government shares in the gain. But because of the loss offset provision, if the investment fails, the government also shares in the loss. That is, the tax lowers the risk borne by the investor. Thus, there are two effects that offset. If the second effect dominates, taxation can make the risky asset more desirable.

Consider the following simple numerical example. In the absence of taxation, an investor would be willing to invest 1 in an asset that has only two possible payoffs per unit invested, either 0 or 2, after deducting opportunity cost of the funds and the cost of the investment. The investor's ex post wealth is risky, and equal to either 2 or 0. Now introduce a tax at the rate of 50 percent on the return to the asset, with full loss offset. Then by doubling the investment in the risky asset, that is, by investing 2 rather than 1, the investor can attain the same distribution of after-tax returns as in the no-tax situation. For by investing 2, the total return after deducting the cost of the investment and the opportunity cost, is either 4 or 0 before tax, and either 2 or 0 after tax. But this after-tax distribution is identical to what could be attained without taxation of the return. In this example, the tax has induced the individual to double investment in the risky asset.⁶¹

Note that in this example, although the amount invested in the risky asset increases, the risk actually borne by the investor, after tax, is the same as in the no-tax situation. That is, private risk bearing has not increased, although total, or social, risk bearing has increased.

The main principle of the example generalizes when the assumptions on which it is based are relaxed: taxation, when it shares in both the losses as

well as the gains, lowers both risk and return, so that it is possible to increase risk taking by taxing it.⁶²

Empirical Verification

Empirical verification of the result is difficult for a variety of reasons. First, taxation affects portfolio choices for reasons unrelated to risk taking, the most important being the differential effective tax treatment of different types of assets that also have different risk characteristics. Second, the unambiguous result above is blunted somewhat when the assumptions are relaxed (see below). Third, it is difficult to obtain reliable information on individuals' actual asset holdings. One reasonably robust empirical result is that higher-income individuals (facing higher tax rates) tend to hold a larger share of their wealth in corporate equity, which is usually considered to be relatively risky.⁶³ This can be interpreted as support for the hypothesis that, when all dimensions are accounted for, taxation in fact increases risk taking.

Limitations and Extensions

Wealth effects of taxation

It has been assumed so far that the safe rate of return is not taxed. If it is in addition taxed, then there will be an income effect associated with the taxation on the return. This income effect can be of either sign, depending on how risk taking responds to wealth. If preferences for bearing risk increase with wealth, then the income effect tends to reduce the demand for risk.

Progressive rate structures

When the tax structure is progressive, returns to a successful investment are taxed more heavily than losses are subsidized. There is thus a bias against risk taking. To help reduce the impact of the graduated rate structure, the tax could allow taxpayers to smooth their tax base over time, either through forward or backward averaging of income. This allows the taxpayer to effectively pool risks that are resolved over time, giving the system more of the characteristics of a proportional tax.

Partial loss offsets

Most tax systems do not allow full loss offsets, either because tax on losses does not earn a credit when there is not sufficient other income to set against the

⁵⁹The traditional exposition assumes that the risk-free rate is zero. It is assumed here that only the return to risk is taxed, that is, the return in excess of the risk-free rate. This is achieved, for example, if the investment is financed by borrowing (at the riskless rate), and interest expense is deductible from income to arrive at taxable income.

⁶⁰This implies that when the tax base is negative, a credit is paid equal to the tax rate multiplied by the amount of the loss. Equivalently, the taxpayer can be allowed to carry losses backward, or forward (cumulative with interest) to achieve full loss offset.

⁶¹That is, to increase total risk bearing by the proportion $1/(1-t)$, where t is the proportional tax rate.

⁶²The case of many risky assets has been analyzed by Sandmo (1977). He shows that the results are similar in essential respects.

⁶³One example is the recent study using U.S. data in Hubbard (1985). For a U.K. study, see Shorrocks (1982).

loss, or because carry forwards do not accrue interest. Moreover, if the company closes, the value of tax loss carry forwards is eliminated.⁶⁴ When loss offsets are not total, then the government shares in the risk only by taking part in any gains, while the losses are carried more than proportionately by the investor. Risky activities would tend to be discouraged under these circumstances, but conceptually the effect is ambiguous, as there are conflicting income and substitution effects, as discussed above.

There may be good reasons for limiting loss offsets in the tax system. For example, under a realization income tax, where the taxpayer can control the realization of income, the taxpayer with many risky projects can avoid taxes by realizing just the losses. In this case, appropriate tax policy must balance the restriction of abuses of the provisions with the cost of limiting loss offsets in terms of discouraging risk taking.

Income risk and capital risk

Two types of risks should be distinguished when discussing the extent of loss offsetting in actual tax systems.⁶⁵ These are income risk and capital risk. Income risk refers to uncertainty regarding future net revenues. It is typically viewed as arising from uncertainty regarding the future price of the firm's output or the future cost of variable factors of production, for example, for resource inputs. Capital risk, on the other hand, arises from uncertain future capital goods values, owing either to an uncertain physical rate of depreciation or future replacement cost of capital. Both types of risk are empirically significant in most countries, and the same set of economic considerations apply to both income risk and capital risk. The two types of risks, however, are often asymmetrically treated in the tax law. In particular, tax systems as they exist are inadequate in treating losses arising from capital risk. Most corporate income taxes allow for the deduction of depreciation, based on the original cost of the asset, from taxable income. The true cost of depreciation, however, is based on the current rather than the original cost of the investment. If replacement cost is uncertain, capital cost allowances based on the original cost of the asset fail to take into account the changes in capital values that occur when capital goods prices change. That is, since the deduction for depreciation is fixed ex ante, the government shares none of the capital risk. Thus, the government does not share capital risk with the private sector, although it does take some of the return, thereby penalizing investments made in projects facing capital risk. To share capital risk, depreciation must be

based on replacement cost depreciation, an ex post concept. The practical problem is in determining the replacement value of thinly traded assets in secondary markets. An alternative is to allow a deduction of a risk premium for capital risk in addition to ex ante (expected) depreciation.⁶⁶ Once again, it is uncertain how to measure the risk premium.⁶⁷

Taxing the investment versus taxing the return to the investment

The example above dealt with ex post taxation of investments where the investor can choose the amount to invest in the asset. There is a tax equivalence in this situation from the point of view of the investor, between ex ante taxation and ex post taxation. Ex ante taxation taxes the act of investment itself, rather than the realized profit of the investment. For example, taxing the amount invested at a rate of 50 percent is equivalent to taxing the return to the investment (with full loss offset) at 33 percent. There is, however, a difference between the two taxes in terms of social risk bearing (see below); in the case of ex ante taxation, the government (i.e., taxpayers in general) bears no risk. The result continues to apply for risks that are not reproducible, but for which good insurance markets exist.

Private risk and social risk

When reproducible risks are taxed with full loss offset, the investor can attain any combination of risk and return that was possible in the absence of taxation. Thus, while total (or social) risk taking increases in response to the imposition of the tax, private risk taking, that is, the risk actually borne by the investor after tax, does not change. The increased risk is borne by taxpayers in general, through uncertain tax revenue. That is, all individuals in the economy are now bearing a new risk, through uncertain taxes on other transactions, to maintain tax revenue (or through uncertain interest rates because of uncertain public sector borrowing requirements) or through uncertainty in the level of public expenditures.

The importance of having the government share in risk depends on how well the private market achieves efficient risk sharing. For risks that are already widely

⁶⁴This is especially important for start-up companies.

⁶⁵See Bulow and Summers (1984).

⁶⁶That is, for neutrality of corporate taxation with capital risk, the allowable depreciation deduction should equal the certainty equivalent of replacement cost depreciation. This certainty equivalent exceeds the expected depreciation, for risk averse individuals.

⁶⁷In models of portfolio allocation, for example, the capital asset pricing model, the risk premium depends on the risk-free rate of return, the return on the market portfolio, and on the covariance structure of the asset.

spread throughout the economy, the government cannot significantly improve risk sharing. If risk-sharing markets are imperfect, or for risks borne by smaller firms that find it difficult to spread risk, the government may, however, be able to provide risk-sharing opportunities that the market cannot provide. If insurance

markets are not complete, a tax system that bears some risk may compensate in part for missing insurance markets, spreading the risks among taxpayers in general. In many instances, a government will be in a position to insure an individual's risk with very little risk to itself.

The Effects of Taxation in Imperfect Markets

RUSSELL KRELOVE

- *How are competitive-economy tax incidence results altered when imperfect competition is present in the economy and when markets do not clear?*
- *How do the effects of a tax depend on interactions with other aspects of the regulatory environment, such as price and quantity controls?*

The effects of taxes depend upon the structure of markets and the concept of equilibrium. Thus, incidence of a tax varies as the concept of the market varies. Earlier sections in this chapter considered the incidence of taxes in markets characterized by perfect competition and market clearing, and in the absence of other distortions in the economy. In this section, we consider incidence in a variety of circumstances that deviate from the perfectly competitive, market-clearing paradigm. First, we consider incidence when the market is not competitive, but dominated by one or several firms. Second, payroll or wage income taxation is analyzed in a developing-country setting where there is migration between the urban labor market and traditional production in the rural areas, with urban unemployment generated by a wage differential. Third, we consider three examples of the interaction of taxes and other aspects of the regulatory environment. One way that the functioning of markets is altered is by government itself, through a variety of regulatory measures. Developing countries typically have a much different nontax policy and regulatory environment from developed countries, with higher protection, rationed foreign exchange, price controls, parallel markets, credit rationing, and other features. These features can alter the standard tax incidence results.

Taxation with Imperfect Competition

The effect of an excise tax on a monopolized market

It is often suggested that an excise tax on a monopolized market would automatically be shifted forward in higher prices to consumers. While it is possible for the monopolist to raise the price by the amount of the tax, it turns out that such a strategy is not generally optimal. Previously, the case of a competitive market was analyzed, and it was shown that incidence depended on supply and demand elasticities. In the alternative polar

case of monopoly (or when an industry is cartelized by a group of colluding firms), the incidence of the tax again depends on elasticities of demand and cost (in particular marginal cost) curves, but the analysis is more complex. In particular, it is possible for the price to rise by more than the amount of the tax, depending on the elasticity of the demand curve. Regardless of the change in output price, however, the pure profit of the monopolist falls with the imposition of an excise tax, so that claimants to this profit bear some of the burden of the tax.⁶⁸

In the absence of a tax, it is well known that production of a commodity by a profit-maximizing monopolist occurs at an output level where marginal revenue is set equal to the firm's marginal cost. If the tax is considered a cost to the firm, then the imposition or increase in the tax has the same effect as an increase in the firm's costs, and in particular its marginal costs. As a result, at the new equilibrium, marginal revenue rises by the increase in marginal cost. The implication for the change in consumer price depends on the shape of the demand and marginal cost curves. At one extreme, if marginal cost is infinite, then output and consumer price do not change, and the tax is borne entirely by claimants to the monopoly profit. At another extreme, if marginal cost is constant across different output levels, then consumer price will rise by more than the amount of the tax for many commonly employed forms of demand function.⁶⁹ This contrasts with the competitive case, where consumer price rises by the amount of the tax when the market supply curve is perfectly elastic.

Finally, specific and ad valorem taxes can have different effects under monopoly, unlike the competitive case. In an equal-revenue comparison of two taxes in a given market, one specific and one ad valorem, it can

⁶⁸Part of the tax can also be shifted backward to other factors of production, through reductions in input prices, lessening the negative impact on profit of the firm.

⁶⁹Marginal revenue is related to price according to $mr = p(1 - 1/eD)$ where mr is marginal revenue, p is price, and eD is the (positive) elasticity of demand, assumed constant in the relevant range. eD is greater than 1 at a monopoly optimum (since marginal revenue is set equal to marginal cost, and marginal cost is positive). Then, if mr rises by the amount of the tax, p must rise by more than that amount to maintain the equality. It should be noted that this result relies on the assumption of a constant elasticity demand curve. By way of contrast, if the demand curve is linear, consumer price rises only by half the amount of the tax.

be shown that the monopolist's output will be higher with the ad valorem tax (and so the consumer price is lower). This is because the specific tax increases marginal revenue by more than the ad valorem tax does.⁷⁰ The implication for policy is that the ad valorem tax is superior to the specific tax, since it induces a monopoly output level closer to the socially efficient level.

Payroll and wage income taxes under unionization

Wages are often determined in markets that are not perfectly competitive, but subject to bargaining and collective agreements. If the supply of a certain type of labor is monopolized through a union, then a tax on payroll or on wage income can have the characteristics of the excise tax on the supply of a monopoly discussed above. The analogy may be incomplete, however, for several reasons. First, for the analysis of union behavior, there is no appealing concept analogous to profit of the firm to act as maximand. The incidence of the tax will depend on the objective of the union, for example, whether the goal is to maximize total before-tax payroll, or after-tax wages, or employment, or some combination. Second, union power in many cases exists in conjunction with monopsony power on the part of employers of labor. Then the decision, and the effect of the tax, is determined by a process of bargaining, and there is no generally accepted theory of bargaining outcomes. Third, in certain countries, wages are determined as a matter of national policy, in centralized collective bargaining. In these cases, the level of taxation on wage income becomes part of the bargaining process itself, so that the exogenous properties of the tax structure (usually assumed in incidence analysis) are undermined.

Taxation and oligopoly

The analysis of tax incidence under oligopolistic conditions is undeveloped, as price determination in such market structures depends on the nature of expectations, on the strategic interactions among firms (both actual and potential) in the industry, and on the solution concept adopted. There is no generally accepted model of oligopoly that resolves the ambiguity, but a collection of models that can be applied in different circumstances. Generally, however, the extent to which the tax is passed forward by a firm depends on its expectations about whether other firms in the industry will follow its price increase. On the one hand, if the firm expects others to take its price increase as a signal for all firms to increase the price, the tax will more likely be shifted forward. On the other hand, if a firm expects its price increase not to be matched by its

competitors, it will avoid the price increase to prevent losing market share.

Payroll and Income Tax Incidence with Unemployment

A prominent feature of many developing countries has been a rapid increase in both rural and urban migration.⁷¹ In models of this phenomenon, the urban wage is rigid, urban employment is controlled, and an urban-rural wage differential is maintained in equilibrium by unemployed labor in the urban sector, where a lower probability of being employed has the effect of equalizing expected wages. A tax on urban wages in this model can affect migration decisions, the amount of unemployment, and wages in the rural sector. Thus, part of the burden of the tax on urban labor is shifted to rural workers, even though employment or the before-tax wage does not change in the urban sector.

Interaction Between a Tax and Other Aspects of the Regulatory Environment

The interaction of taxes with other policy interventions that are important parts of the economic environment in developing countries can alter the standard incidence results in significant ways. In this section, three instances are considered: the effect of an excise tax when price controls exist that have encouraged the development of a parallel market; the effect of tariffs when there are quantity controls on imports; and the effect of a company tax when firms are credit rationed. In all three cases, the incidence results differ from the incidence when such non-tax controls on markets are absent.

Price controls and excise tax incidence

The widespread use of price controls for many items subject to sales and excise taxes can change the incidence of the tax. If the price-controlled firm is legally allowed to pass the tax through, then the price will rise by the amount of the tax, regardless of supply and demand elasticities. If there is no legal provision allowing the tax to pass through, then the tax is shifted backward to recipients of factor incomes.

A more complete analysis would consider that price controls also often encourage the emergence of parallel (or black) markets.⁷² When this is so, the imposition of a tax may also change the relative volumes of trade on regular and parallel markets, will affect the

⁷⁰For the proof of this assertion, see Musgrave (1959), pp. 287–311.

⁷¹See Harris and Todaro (1970). Various aspects of the problem are also discussed in the survey by Burgess and Stern (1993).

⁷²See Shah and Whalley (1991).

amount of time spent queuing to obtain white market goods, and will also affect parallel market prices. Thus, the tax can be borne in part by transactors on the parallel market, as well as by purchasers on the formal market.

Incidence of an import tariff under quantity restrictions

The usual incidence assumption for import taxes (or for the import component of VAT) is that they are fully shifted forward. An assumption of forward shifting implies that tariffs are treated in a similar manner to sales taxes, and hence, tend to be viewed as regressive. The results would be different, however, if, as in developing countries, there are, in addition, quantitative restrictions on imports, whether directly imposed through quotas, or arising indirectly through rationed foreign exchange or prior import deposit requirements, or other forms of quantitative control. When quantitative controls are binding, the tax will be borne

by recipients of the quota rents, with the tax having no effect on domestic consumer prices. Since rights to quotas are usually allocated to higher income groups, tariffs with such incidence would be more progressive than in the situation without controls.

Credit rationing and corporate tax incidence

Credit rationing, whether undertaken by government or practiced by private lending institutions, is common in many developing countries. Such rationing acts as a quantity control, and just as with import quotas, can affect the incidence of a tax, in this case, of the corporate income tax. With credit rationing, rents are generated, and the corporate tax will primarily take rents away from those who qualify for rationed credit, lowering the return to their own investment of time and money. To the extent that those with access to credit are in the upper tail of the income distribution, the tax may be more progressive than under freer access to capital markets.

The Theory of Second Best

RUSSELL KRELOVE

- *When the conditions ensuring full efficiency are not attainable in one or more sectors of the economy, how should the conditions for efficiency be amended in the other sectors of the economy?*
- *Under what conditions are uniform taxes or uniform tariffs second-best optimal?*
- *What is the potential role for quantity controls, in-kind transfers, queuing, and similar policies in a second-best environment?*

The theory of second best addresses the following question: When the conditions ensuring full efficiency are not attainable in one or more sectors of the economy (that is, when irremediable distortions exist among relative prices), how should the conditions for efficiency be amended in the other sectors of the economy? The constraints in the uncontrolled sectors often arise from institutional, observability, and information problems that are usually assumed away in the standard "first-best" analysis, where the government possesses complete information and, through its policy instruments, has control over the allocation of resources in the economy. The problem of the second best applies beyond public finance, to all areas of economic policy.⁷³ The purpose of this section is to consider its relevance for tax policy recommendations.

Through argument and example, the following four major points concerning tax policy in second-best environments may be established:

- If a tax distortion exists in one market (i.e., there exists some constraint that prevents the first-best optimal conditions from being satisfied in this market), adding another tax distortion can be beneficial;
- Conversely, if several tax distortions exist, removing one distortion may not be beneficial;
- Optimal policy in second-best situations may conflict with the usual intuition accompanying first-best policy advice. In particular, policies that would not be desirable in a first-best environment may have a role to play in a second-best environment. For example, ration-

ing may increase welfare when tax distortions are unavoidable; and

- Policy design in second-best environments is complex, depending on the nature of the objective and on the instruments assumed available. In general, distortions should be introduced at all margins in the economy with the second-best optimal policy. Thus, the informational demands on tax policymakers are enormous. Nevertheless, some constructive, simplifying results are available. In particular, in certain circumstances, conditions familiar from first-best analysis may persist in second-best optimal policy. For example, in a wide class of second-best situations, it is not desirable to introduce distortions into the production sector of the economy. Further, when additional constraints, other than constraints on available instruments, are introduced, for example, political constraints and constraints on administrative capability, the analysis may sometimes support the use of first-best type policy recommendations, on account of the simplicity and informational parsimony of first-best rules.

By its nature, second-best policy involves an investigation of the interactions between markets. For this reason, the analysis is inherently general equilibrium.

An Instructive Example: Nonuniform Indirect Tax Rates to Increase Welfare

The deadweight loss of a set of distortionary taxes depends on the whole set of tax rates and the demand relations among the goods. Thus, to consider the combination of taxes that raise a given revenue, complementarity and substitutability among all goods, taxed and untaxed, must be considered. The example in this section brings out that there is no reason for these relations to yield optimal taxes that are uniform across all taxed goods.

Suppose we wish to raise a certain amount of revenue from an individual. A lump sum tax levied on the individual, that is, a tax the size of which cannot be influenced by the individual's market behavior, can raise the revenue costlessly, in the sense that the welfare loss to the individual is equivalent to the government's gain. A lump sum tax does not distort relative prices of goods. Equivalently, indirect taxes at a uniform rate on

⁷³The problem was first systematically treated by Meade (1955). Definition of the problem was significantly advanced by Lipsey and Lancaster (1956–57).

all goods that the individual consumes, including leisure, can raise the required revenue without distorting the relative prices of goods. Now, introduce the constraints on policy that lump sum taxes are unavailable and that leisure cannot be taxed, perhaps because its consumption cannot be observed. Suppose, however, that all other goods can be taxed freely. The question is whether it is still optimal to tax all other goods at a uniform rate. Such a tax policy would not distort the relative prices of all taxable goods, so that they preserve the usual first-best conditions on the relation between marginal rates of substitution and marginal rates of transformation. This tax structure would, however, make all taxable goods more expensive relative to leisure, so that it is distortionary if labor supply is not perfectly inelastic.

Corlett and Hague (1953) showed that such uniform indirect taxation is not optimal. Beginning with uniform taxation, a move that raises taxes on goods that are complementary to leisure (e.g., tennis rackets) and lowers taxes that are substitutes for leisure (work clothes) while maintaining the revenue yield, would be beneficial. The intuition is that by taxing complements to leisure, leisure is indirectly made more expensive, offsetting to some extent the encouragement to leisure arising from its relative price falling as other goods are taxed. Thus, in general, uniform indirect taxation is not optimal.

Examining this conclusion from another perspective illustrates a second important principle of second-best tax analysis. The result shows that if there are constraints on taxation, and if taxable goods are not taxed uniformly, then moving toward uniformity, that is, removing the distortions among taxed goods, is not necessarily beneficial. Only if all distortions are reduced proportionately can improved results be shown.

These results were interpreted as negative because they imply that policy advice firmly rooted in careful economic analysis is much more informationally demanding in second-best environments. This was too pessimistic, however; as the next subsection indicates, a variety of results exist to guide the design of second-best tax policy.

Constructive Second-Best Results

In this section, selected examples of second-best analysis and policy design are discussed. Three types of results are illustrated. First, the second-best rationale for low taxation on as broad a base as possible is presented. Second, an example of attempts at identifying important cases where simple first-best optimum conditions are valid for a subset of policy decisions in a

second-best environment is illustrated. Third, the question, under what conditions does the introduction of extra constraints besides standard second-best constraints on the tax instruments available actually support first-best type recommendations is asked. Finally, an example shows that when there are constraints on taxation, there is scope for additional policies, for example, rationing and queuing, that are usually ruled out as inferior in first-best analysis.

The case for many small taxes

The deadweight loss of an excise tax on a good increases geometrically with the rate of tax. If cross-price demand elasticities are sufficiently small—relative to own-price elasticities—to be ignored, then the tax system that raises a given revenue with the least efficiency loss would tax as many goods as possible, all at a low rate. This result has to be tempered for equity considerations, administrative feasibility, and because many substitutability and complementarity relations among goods are important.

Production efficiency in a distorted economy

It is straightforward that production efficiency is desirable in a first-best world: when production is not efficient, it is possible to increase the output of all goods, with the surplus distributed to increase welfare. An important question that arises in second-best situations is under what conditions should production efficiency be preserved? That is, when the government can induce distortions in production through differential taxation of factors in different uses (e.g., by taxing capital services in the corporate and noncorporate sectors at different rates), when is it optimal to do so? It turns out that under certain conditions, it is not optimal to induce production inefficiency.⁷⁴ When the government possesses enough flexibility in taxation so that it can place any desired wedge between producer and consumer prices in each market, and when the government can flexibly tax all firms' pure profit, then production efficiency is desirable. When these conditions are not met, then taxation of inputs used in the production of the untaxed goods is desirable, as an indirect method of taxation of those goods.

When the conditions for production efficiency hold, the result has some strong implications. First, there should be no taxation of intermediate goods. Second, in an open economy, trade with the rest of the world can be considered as another production possibility. The production efficiency result implies that when the country is small in world markets, then optimal tariffs

⁷⁴See Diamond and Mirrlees (1971).

are zero, that is, all indirect taxation should be on final goods only, irrespective of origin.

The conditions necessary for production efficiency are strong, and are unlikely to be satisfied in any economy. The lesson to be derived, as Stern (1987) argues, is that in any situation, care needs to be taken to justify departures from production efficiency in terms of specific and well-defined arguments. For example, tariffs on imports at rates in excess of the rates of tax on domestic production would have to be justified by identifying final goods that are difficult to tax, or profits that cannot be taxed away directly.

When are optimal tariffs and optimal taxes uniform?

An important question in developing country tax policy is whether and when a case can be made for a uniform tariff structure. At a general level, the standard optimal second-best taxation arguments suggest that when tariffs are appropriate, differential tariff rates would constitute the optimal policy, with different rates across final goods and also across imports of raw materials and other business inputs. That is, in general, effective protection would not be uniform over commodities (see Chapter V). A variety of other constraints, however, support the argument for uniform effective protection.⁷⁵ Political economy considerations, inadequate information on elasticities, and administrative convenience all support a minimally differentiated tariff structure. Thus, by introducing new constraints and transactions costs, the second-best policy may be uniform.

A similar set of considerations arise with regard to the implementation of domestic indirect taxation.⁷⁶ There, the support for uniform indirect taxation, for example a VAT with a single rate, is based on constraints on policy arising from weaknesses in the information needed to calculate optimal differentiated taxes, and constraints arising from administrative capability and political constraints. The first two of these are particularly important in developing countries.

An important issue for growth in developing countries is taxation of capital income, and in particular, whether it is best to target specific types of investment for preferential treatment or whether it is best to adopt neutral taxation, thereby "leveling the playing field" by taxing all types of capital income uniformly. Some simulations for the United States⁷⁷ suggest that while, for standard second-best reasons, a neutral tax would not be the optimal policy, the cost of adopting a uniform

taxation policy would be small. Thus, the increased administration costs of discriminatory policy would more than offset the gain. In addition, other empirical work on a large sample of developing countries has found no empirical evidence to suggest that there are identifiable social externalities accruing to certain types of investment that would support preferential tax treatment of such investment.⁷⁸

In these and other similar cases, the debate about the place of uniform versus nonuniform taxation in real-world tax policy will revolve around issues of observability of the relevant parameters of tastes and technology (including the stability of those parameters), the technology of administerability of taxes, and the nature of other constraints on policy, including political and fairness.

Quantity controls, in-kind transfers, and queuing as second-best policies

The rationing of certain commodities and the provision of free goods are obviously deleterious to efficiency in an economy satisfying the assumptions of the first-best model. To introduce such policies would create distortions. However, if distortions already exist, for example because taxes exist, their introduction may be beneficial. Nevertheless, not any rationing, in-kind transfer, or queuing policy results in an improvement. These policies must be carefully designed and calibrated to have their intended effect. In general terms, the arguments are economically intuitive. What is established here is that the potential exists, that is, what are normally considered nonstandard policies—rationing, in-kind transfers, and queuing—may serve as useful welfare-enhancing policies in second-best environments.

- *Quantity controls.* Quantity controls can play a role in welfare enhancement as an accompaniment to commodity taxation. For instance, if a tax is placed on a commodity, say milk, consumers place a higher marginal evaluation on an extra liter of consumption than the cost of production of that liter. If consumers are forced to buy (at the consumer price) and consume one more liter, it is straightforward to show that they are made better off by this policy. Paying for and consuming an extra unit has only a negligible effect on welfare,⁷⁹ but since there is a positive tax, the government receives extra revenue, permitting it to lower

⁷⁵See Subramanian, Ibrahim, and Torres-Castro (1993).

⁷⁶See Tanzi (1992).

⁷⁷See Auerbach (1989).

⁷⁸See Auerbach, Hassett, and Oliver (1993). The full sample comprises 88 countries including OECD countries, and developing countries on almost all continents, but excluding high-income oil-exporting nations.

⁷⁹Technically, since any consumer is initially consuming an optimal bundle of commodities, a small move along the budget constraint is also a move along the consumer's indifference curve.

other taxes, which makes consumers better off. Conversely, rationing of products that are being subsidized by government can be beneficial.

- *In-kind transfers.* It is a common first-best assertion that the redistribution of wealth among individuals is always done more efficiently by means of cash transfers than by transfers in kind. This may not be true, however, when it is difficult for the government to identify those to whom it wishes to distribute. In this case, by providing goods (which cannot be costlessly resold) that are relatively more preferred by the favored groups, the government can target its policy to those that it wishes to help. That is, by supplying specific goods, it induces these groups to reveal their characteristics by their choices. Cash transfers, being valued by all groups, including nonfavored groups, would not so readily induce such self-selection.

- *Queuing.* Queuing as a rationing device imposes a pure deadweight loss in a first-best environment, as there is no gain to offset the lost time spent waiting. In a second-best environment, however, there is a rationale for queuing, which is closely related to the previous argument supporting the use of in-kind transfers. If it is difficult for the government to identify the members of the favored groups, when these groups have a lower marginal valuation of time, they can be induced to reveal themselves if they are required to queue for a period of time to receive a transfer. Since their valuation of time is lower, they are more likely to stand in line, thus revealing that they belong to the favored groups. It is important to note that the government is not requiring queuing to be mean-spirited; by using this method of inducing the favored groups to reveal themselves, the government is able to better target the transfer policy, actually making the favored groups better off than if queuing is not used.

The targeting principle in second-best policy environments

An important principle of first-best policy advice is the principle of targeting, which argues that a distor-

tion is best offset by a tax instrument that acts directly on the relevant margin. Thus, the best response to an externality, for example pollution, is a Pigouvian tax on the polluting activity, rather than, say, a tax on consumption of the commodity, or a tax on the use of inputs into the production of the commodity. The extent to which the principle is useful in second-best analysis is an important but difficult question, with the answer depending on the nature of the objective and the constraints on policy. Two results are available, however, that suggest in many circumstances the targeting principle may apply. First, it has been shown⁸⁰ that when complete commodity taxation is available, at possibly different rates, if it is desired (for whatever reason) to increase domestic production of a tradable good, the best way to accomplish this is by direct subsidies to producers, rather than tariff protection from imports. Second, the problem of international tax harmonization that arises when countries are constrained in the use of optimal lump-sum taxes to raise revenue is best addressed by a policy that directly alters countries' marginal incentives to attract mobile capital from other countries.⁸¹

Concluding Remarks

There persists a large gap between normative tax theory and practical tax policy. This is particularly true in second-best environments. Nevertheless, as this section has indicated, the theory provides some insights into the design of policy. The challenge for practitioners is to identify conditions under which the insights are applicable and to adjust their prescriptions to cohere with the wide variety of real-world constraints on policy, arising from politics, information, and incentives.⁸²

⁸⁰See Dixit (1985).

⁸¹See Krellove (1992).

⁸²See Tanzi (1992).

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III

DOMESTIC CONSUMPTION

AND

PRODUCTION TAXES

Theory of Optimal Commodity Taxation

HOWELL H. ZEE

- *What problems does the theory of optimal commodity taxation address?*
- *What are the most important optimal tax rules and their economic implications?*
- *What are the merits and limitations of the optimal tax rules?*

The theory of optimal commodity taxation is primarily concerned with the problem of determining the structure of taxes on various commodities to raise a *given* amount of revenue with a minimum of the tax-induced efficiency loss as defined in Chapter II. While the problem can be analyzed in a multiperson framework to bring equity considerations to bear on the determination of such a tax structure, it is more natural and instructive to delay combining efficiency and equity concerns until the discussion of the theory of optimal income taxation (Chapter IV). Furthermore, the purely efficiency aspect of optimal commodity taxation can be of interest in and of itself, since it has important tax policy implications quite apart from equity issues. Accordingly, the entire analysis in this chapter is framed in the context of a one-person (representative-consumer) economy.¹

Defining the Problem

To focus ideas and to simplify exposition, consider a concrete example of the consumer's budget with income from two sources (earned and unearned) and expenditure on two commodities, X and Y . His earned income is the product of the wage rate (w) and the amount of time he devotes to work (L), that is, $w \cdot L$. Let his unearned income (e.g., inherited wealth), the amount of which is assumed to be unalterable by his own behavior, be denoted by K . In the absence of taxation, his budget constraint can be written as

$$K + w \cdot L = p_X \cdot X + p_Y \cdot Y \quad (1)$$

where p_X and p_Y are, respectively, the producer prices of X and Y . If T is the consumer's total available time and ℓ is his demand for leisure, then it must be true that $T = L + \ell$, in which case, equation (1) can be restated as

$$K + w \cdot (T - \ell) = p_X \cdot X + p_Y \cdot Y \quad (2)$$

Let τ_w , τ_X , and τ_Y be, respectively, the ad valorem tax rates on wages, commodity X , and commodity Y . With these taxes, the budget constraint becomes

$$K + w \cdot (1 - \tau_w) \cdot (T - \ell) = p_X \cdot (1 + \tau_X) \cdot X + p_Y \cdot (1 + \tau_Y) \cdot Y \quad (3)$$

or, after a slight rearrangement,

$$K + w \cdot (1 - \tau_w) \cdot T = p_X \cdot (1 + \tau_X) \cdot X + p_Y \cdot (1 + \tau_Y) \cdot Y + w \cdot (1 - \tau_w) \cdot \ell \quad (4)$$

The budget constraint as stated in equation (4) has two important implications. First, the demand for leisure is conceptually no different from that for other commodities. Second, since τ_w enters the right-hand side of equation (4) with a negative sign, a tax on wages is seen to be partly equivalent to a subsidy on leisure (the equivalence is only partial because τ_w also appears on the left-hand side of equation (4)). Putting it differently, if leisure is to be taxed, τ_w must be negative (this in turn implies that labor is subsidized).

The optimal commodity tax problem can now be defined as one of determining the optimal values for the tax rates τ_w , τ_X , and τ_Y to raise a given amount of tax revenue with a minimum efficiency loss. The solution to this problem can be stated in terms of a number of tax rules, the validity of some of which requires special assumptions regarding the feasible scope of taxation and the nature of the consumer's demand curves. Four such rules are especially well-known for their important economic implications: the proportionality rule, the Ramsey rule, the inverse elasticity rule, and the Corlett-Hague rule. Each of these rules is separately discussed below. It must be emphasized that the generality of the first three rules is in no way affected by the special three-commodity (X , Y , and ℓ) example adopted above; they can be generalized to apply to any number of commodities in a straightforward manner.

Optimal Tax Rules with Fixed Producer Prices

This section considers optimal tax rules on the assumption that w , p_X , and p_Y are invariant to the tax rates (i.e., the producer, or tax-exclusive, prices remain the same before and after the introduction of the

¹Various aspects of optimal commodity taxation are covered in, among others, Auerbach (1985), Diamond and Mirrlees (1971), Dixit (1975), Samuelson (1986), and Sandmo (1976).

taxes). Complications arising from relaxing this assumption are noted in the following discussion.

Proportionality rule

The proportionality rule states that if *all* commodities are taxable, then the optimal tax structure would be one where the tax on each commodity, expressed as a proportion of its price, is the same for all commodities. This implies that all commodities should be taxed at the *same rate*. The economic intuition behind this rule is easily demonstrated. As discussed in Chapter II, the efficiency loss of a tax arises from its distortion of relative prices. If all commodities are taxable and taxed at the same rate, however, then relative prices would not be affected and, as a consequence, no efficiency loss can arise.

In the context of the above example, the proportionality rule requires that all three tax rates be set equal to each other, i.e., $\tau_X = \tau_Y = -\tau_w = \tau$, where $\tau > 0$ is the common ad valorem tax rate (as noted earlier, τ_w must be negative if leisure is to be taxed). It immediately follows from such a tax structure that the budget constraint in equation (4) becomes

$$K/(1 + \tau) + w \cdot T = p_X \cdot X + p_Y \cdot Y + w \cdot l, \quad (5)$$

which implies that the proportionality rule in fact amounts to taxing the consumer's unearned income, K , at the rate $\tau/(1 + \tau)$. By assumption, the magnitude of K cannot be altered by the consumer's own behavior. Hence, this tax is equivalent to a lump-sum tax and entails no excess burden.

Since taxing all commodities at the same rate is the simplest tax regime implementable, at first glance, the proportionality rule seems to provide a happy coincidence between theoretical optimality and administrative simplicity. This is, unfortunately, not the case. A closer examination of equations (4) and (5) reveals that the practicality of the rule is predicated on several critical assumptions. First, the consumer must have unearned income. If $K = 0$, then the government receives no tax revenue. This is because the revenue raised from taxing commodities X and Y is just offset by the subsidy to labor (i.e., the tax on leisure) to preserve the proportionality of the tax structure. Second, even if K is positive, it must be sufficiently large to enable the government to raise the required amount of revenue.² Third, the optimality of the proportionality rule hinges on the ability of the government to tax all commodities. If, as is usually the case in realistic policy settings, not all commodities are taxable (e.g., taxing leisure, or,

equivalently, subsidizing labor, is seldom a feasible policy option), then the rule is not applicable. For these reasons, the proportionality rule, though elegant, is of extremely limited practical value.

The remaining three tax rules all deal with situations in which some commodities are nontaxable. For concreteness, assume that leisure is the nontaxable commodity in the above example, so that τ_w is identically equal to zero. The government must, therefore, meet its revenue needs solely from taxing commodities X and Y by optimally setting τ_X and τ_Y .

Ramsey rule

The Ramsey rule states that, for a commodity tax structure to be optimal, the proportional tax-induced reduction in the *quantities* demanded of a taxed commodity, as measured along its *compensated* demand curve, should be the same for all taxable commodities.

Two aspects of the Ramsey rule are worth emphasizing. First, it is stated in terms of tax-induced changes in quantities, not prices. This is because, ultimately, the efficiency loss associated with taxation stems from the fact that commodity taxes, unless imposed in lump sum, would induce the consumer to adopt a pattern of (compensated) demands for commodities that is different from that which he would have adopted in the absence of the taxes. It is this induced change in the quantities demanded of various taxed commodities that gives rise to the excess burden of taxation; the induced change in the relative prices of the taxed and nontaxed commodities is only the means through which the quantity changes are effected.

The second notable aspect of the Ramsey rule is that it is stated in terms of the compensated, not the ordinary, demand curves. In effect, this rule is one that minimizes the total efficiency loss from taxing the different commodities as measured by either one of the two Hicksian measures, and not by the DMH measure, of excess burden.³ If the symbol Δ is used to denote the change in a variable, then the Ramsey rule, as applied to the above two-taxable commodities example, would imply that the optimal values for τ_X and τ_Y are those that would produce the equality

$$\Delta X'/X_0 = \Delta Y'/Y_0, \quad (6)$$

where the prime "'" on a variable indicates that the change in the variable is to be measured in the compensated sense, and the subscript 0 on a variable fixes

²Equation (5) indicates that the total revenue raised by the tax is $K \cdot \tau / (1 + \tau)$.

³See Chapter II for a discussion of the concept of compensated demand curves, as well as the difference between the Hicksian and DMH measures of excess burden.

the reference point (e.g., the pretax or posttax situation) against which the change is to be defined.

The intuition behind the Ramsey rule is straightforward. Suppose, for example, that some values for τ_x and τ_y are chosen so that equation (6) is violated. Then, the sum of the excess burdens on X and Y (the relevant triangular areas under the compensated demand curves of the two commodities) could be reduced simply by altering the *relative* values of the two tax rates, that is, the increase in the excess burden on one commodity resulting from raising its tax rate would be more than offset by the decrease in the excess burden on the other commodity resulting from lowering its tax rate. No further reduction in the sum of the excess burdens would be possible once the point is reached where, at the margin, any additional adjustment in the tax rates results in equiproportional changes in the compensated quantities demanded of the two commodities. Since the condition of equiproportional changes is stipulated in terms of quantities, the Ramsey rule would lead, in general, to nonuniform (i.e., unequal) tax rates among the taxed commodities.⁴

The validity of the Ramsey rule is perfectly general; it requires no special assumptions concerning the nature of the consumer's demand curves. Because it is stated in terms of compensated quantities, however, it shares with the Hicksian measures of excess burden the major shortcoming that it cannot be applied on the basis of readily available economic data, as compensated demand curves are not directly observable.

There is one notable circumstance under which the Ramsey rule is valid even if stated in terms of ordinary (and not compensated) quantities: the consumer's demands for the taxed commodities are such that a change in his income produces equiproportional changes in all their quantities demanded. In this case, the rule can be equivalently stated as

$$\Delta X/X_0 = \Delta Y/Y_0 \quad (7)$$

where all quantities in equation (7) can now be derived from ordinary, directly observable demand curves. It will be recalled from Chapter II that this special case corresponds precisely to the condition (the so-called homothetic demands) for path independence of the DMH measure of excess burden when there are multiple price changes.

⁴The Ramsey rule *would* imply the uniform taxation of taxable commodities, if the consumer's demands for the nontaxed commodities are not affected by a change in any of the taxes.

Inverse elasticity rule

If the ordinary demand for every taxed commodity is independent of all prices except its own, then the optimal tax rates on these taxable commodities are inversely related to the (absolute) values of their ordinary own-price elasticities of demand (ϵ). In the two-taxable commodities example above, this rule takes the form of

$$\epsilon_x \cdot [\tau_x / (1 + \tau_x)] = \epsilon_y \cdot [\tau_y / (1 + \tau_y)] = \alpha, \quad (8)$$

where α is some (positive) constant. It follows immediately from equation (8) that the lower the (absolute) value of a taxable commodity's ordinary own-price elasticity, the higher should be its tax rate.

Of all the well-known tax rules, the inverse elasticity rule is perhaps the most intuitively obvious. As has been pointed out in Chapter II in the single-taxable commodity case, the excess burden of a tax varies positively with its own-price elasticity. Hence, for any given tax rate, the tax would lead to a smaller excess burden if imposed on a commodity with a low own-price elasticity, than on one with a high own-price elasticity. While this conclusion does not, in general, follow in the multiple-taxable commodity case, the assumption that the demand for every taxable commodity is independent of all prices except its own does imply that the excess burden on each taxable commodity could be analyzed *as if* it is the only taxable commodity.

Another appeal of the inverse elasticity rule is that it is stated in terms of ordinary, and, therefore, directly observable demand curves. This property follows from the fact that when the ordinary demand curve of a taxable commodity depends only on its own price, it will not shift when the prices of other taxable commodities are changed. Hence, minimizing the DMH measure of excess burden under an ordinary demand curve is equivalent to minimizing any one of the Hicksian measures of excess burden under the associated compensated demand curve.⁵ Indeed, it is equally valid to state the inverse elasticity rule in terms of the compensated demand curves.

If the consumer's demands for all taxable commodities are independent of each other, as assumed, then the entire burden of tax-induced adjustments in his pattern of consumption would necessarily fall on the nontaxable commodities. Hence, the usefulness of the inverse elasticity rule as a guide for tax policy rests essentially on one's evaluation of the reasonableness of

⁵Of course, the DMH and Hicksian measures would still lead to different *sizes* of the excess burden of a tax, for reasons explained in Chapter II.

this implication regarding the nature of the consumer's demand curves.

Corlett-Hague rule

Suppose that, as assumed, there are only two taxable commodities in addition to the nontaxable leisure. Then the Corlett-Hague rule states that the commodity which is a stronger complement (or weaker substitute) of leisure than the other should be taxed more heavily.⁶

An intuitive explanation of the Corlett-Hague rule is simply that, even though there is, by assumption, a nontaxable commodity, this commodity can nevertheless be taxed indirectly by taxing the commodity whose consumption is complementary to it. Because its application involves the use of compensated demand curves, the Corlett-Hague rule, though highly instructive, suffers from the same limitation as the Ramsey rule.

As stated, the Corlett-Hague rule would not necessarily hold in the case of more than two taxable commodities. A slight reformulation of the rule, however, could permit it to be generalized without altering its original spirit. Suppose all taxable commodities are initially taxed at the same rate. Then, if the tax revenue is held constant, raising the tax rates on all commodities, which are stronger complements (or weaker substitutes) of leisure than those whose tax rates are being lowered, would increase welfare. The crucial difference between the earlier Corlett-Hague rule for the two-taxable commodities case and this reformulated version is that the latter need not imply that, in a pairwise comparison of commodities *within* each of the two groups of commodities whose tax rates are being either raised or lowered, the optimal tax rate is necessarily higher on the commodity which is a stronger complement (or weaker substitute) of leisure than that on the other commodity.

⁶Technically, two commodities are considered complements if a rise in the price of one commodity leads to a decrease in the compensated quantities demanded of the other commodity. They are considered substitutes if the reverse occurs.

Optimal Tax Rules with Variable Producer Prices

If the producer prices of the commodities adjust in response to the tax-induced changes in their demands, then it is natural to expect that the optimal tax rules would involve supply responses as well. This, in fact, turns out to be the case. Unfortunately, these supply responses do not, in general, enter into the tax rules in a neat and easily interpretable way. There are, however, two important and interesting special cases.

First, if the economy's production is characterized by constant returns to scale,⁷ then all of the optimal tax rules derived under the assumption of fixed producer prices would remain valid under variable producer prices. This is a particularly important result, since decentralized competitive markets are best supported by constant returns to scale technologies. Second, if *both* the ordinary demand for, and supply of, every taxed commodity depend only on its own price, then the optimal tax rule would only involve a simple combination of ordinary own-price elasticities of demand (ϵ) and supply (η). In the two-taxable commodities case, this rule can be stated as

$$\frac{\tau_X \cdot \eta_X \cdot \epsilon_X}{(1 + \tau_X) \cdot \eta_X + \epsilon_X} = \frac{\tau_Y \cdot \eta_Y \cdot \epsilon_Y}{(1 + \tau_Y) \cdot \eta_Y + \epsilon_Y} = \beta, \quad (9)$$

where β is again some (positive) constant. Evidently, equation (9) gives rise to a generalized version of the inverse elasticity rule: the optimal tax rate on a commodity is now seen to be inversely related to both its own-price elasticity of supply and the absolute value of its ordinary own-price elasticity of demand.

⁷It must be emphasized that this is *not* equivalent to the phenomenon of constant marginal costs.

General Sales/Turnover Tax

Tax Cascading: Concept and Measurement

HOWELL H. ZEE

- *What is tax cascading, why is it undesirable, and what are its major determinants?*
- *How can tax cascading be illustrated through some simple analytics?*
- *How can the degree of tax cascading be estimated?*

Whenever a commodity or service is taxed more than once under one tax as it passes through various stages of the production-distribution chain, for example, from the manufacturing to the retail stage, tax cascading results. A classic tax that gives rise to cascading is the multi-stage general turnover tax.⁸ Under this tax, every sales transaction is taxed, possibly at different stage-specific or transaction-specific rates, or both. Thus, a tax of x percent could be imposed on the sales of rubber, and a tax of y percent could be imposed on the sales of tires. Since the value of the rubber is incorporated into the value of tires, the former is taxed twice. It could, in fact, be taxed several more times, as would be the case if, for example, the sales of the tire wholesaler who buys the tires from the manufacturer are also subject to a tax of z percent. It is easy to surmise from the above that the effective tax burden of a cascading tax on a taxed commodity or service, by the time it reaches the final consumer, could be much higher than the tax's nominal rate that is explicitly applied at the stage where the consumer makes his purchases. To put it differently, even if a commodity or service is exempted from tax at the retail stage, it may well be the case that its price would include tax elements stemming from taxes imposed at earlier stages on the various inputs used in its production. The true burden of a cascading tax is, therefore, frequently hidden from the consumer.

A cascading tax is universally regarded as undesirable, since by taxing transactions at stages prior to the stage of final consumption, it leads to more severe eco-

nomic distortions than would a tax imposed only on final consumption, such as a retail sales tax or a full-fledged value-added tax (VAT) extended to the retail stage.⁹ Short of replacing a tax that cascades with one that does not, however, there are various mechanisms available to alleviate the extent of the cascading. These mechanisms are discussed in the next section entitled "Mechanisms to Alleviate Cascading."

Determinants of the Degree of Cascading

The degree to which the true burden of a cascading tax is passed on to the final consumer depends on a number of complex but intertwined factors. Some of the more important ones are identified in this chapter.

Demand and supply elasticities

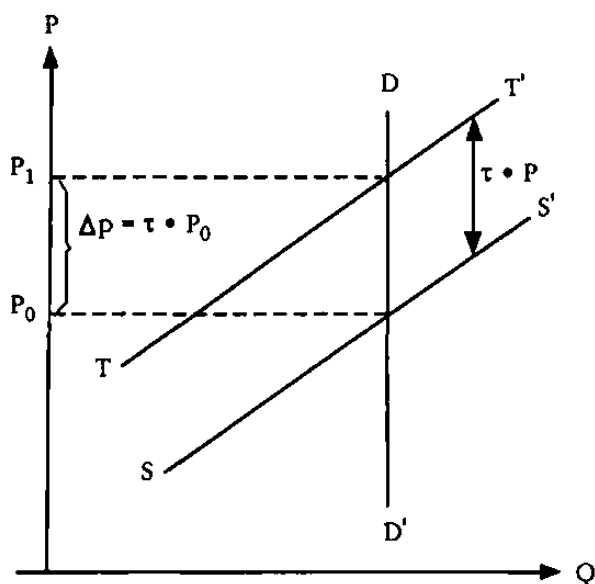
As is well known, the ability of a producer to shift the burden of the tax on his output to the purchaser depends on the relevant demand and supply elasticities. In a partial equilibrium framework of a single taxed commodity, the outcomes of four different combinations of such elasticities are illustrated in the four panels of Figure III.1. In each of the panels, DD' is the demand curve, SS' is the pretax supply curve, and TT' is the posttax supply curve. The vertical distance between the SS' and TT' curves at every price level P is simply equal to $\tau \cdot P$, where τ is the ad valorem tax rate. If P_0 and P_1 denote the pretax and posttax equilibrium price levels, respectively, then it is easily seen from Figure III.1 that the extent to which the price level would rise after the imposition of the tax would depend on the particular configuration of the demand and supply curves (the symbol Δ in Figure III.1 is used to denote a change in any variable). Full forward shifting of the tax, in the sense that the purchaser bears the entire tax burden because the price level is increased by the same rate as the tax rate, would occur when either the demand curve is vertical (panel (a) of Figure III.1), that is, the elasticity of demand is zero, or the supply curve is horizontal (panel (d) of Figure III.1), that is, the elasticity of supply is infinite. No forward shifting would result if instead the demand curve is horizontal (panel (c) of Figure III.1). Under most

⁸This tax is also known as a gross receipts tax or a transaction tax (see Due (1988) for a general discussion).

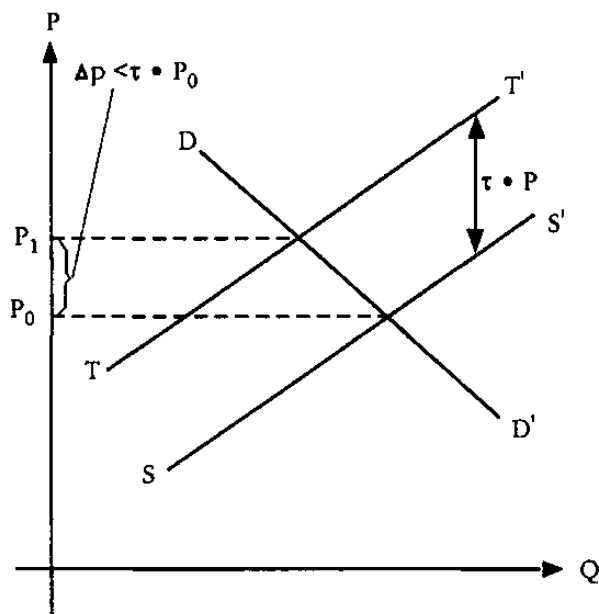
⁹A general cascading tax imposed at a *uniform* rate would not, of course, lead to distortions in the choice of optimal factor proportions in a production process. It would, however, lead to excessive vertical integration in an economy's industrial organization.

Figure III. 1. Demand and Supply Elasticities and the Forward Shifting of the Tax Burden

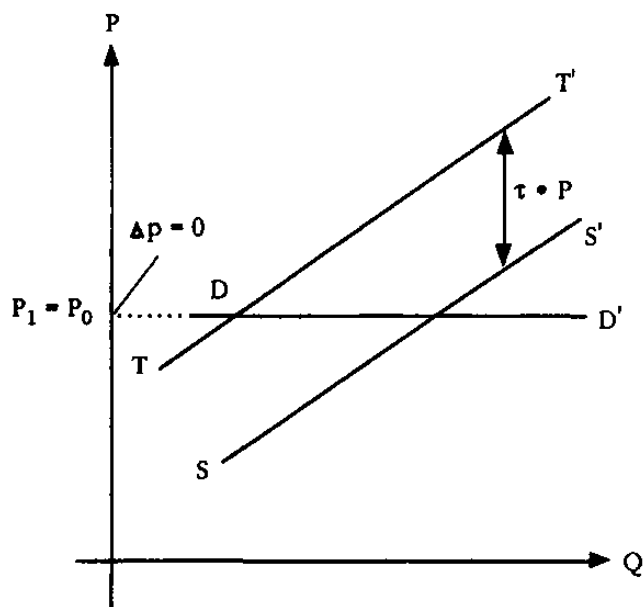
(a) Complete forward shifting



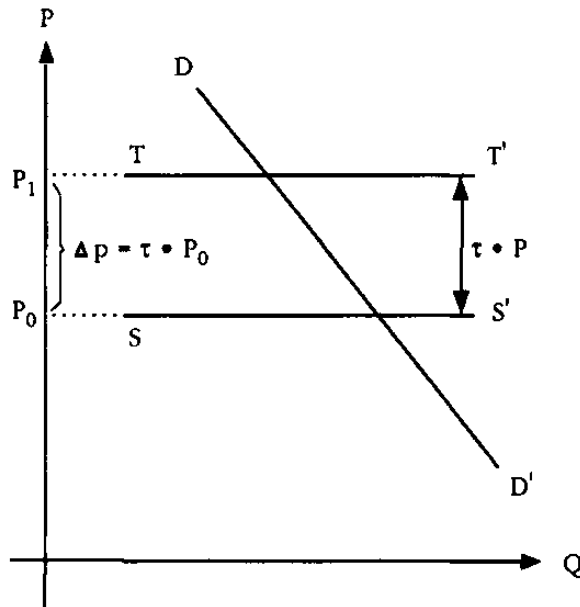
(b) Partial forward shifting



(c) No forward shifting



(d) Complete forward shifting



circumstances where neither the demand nor the supply curve displays an extreme elasticity, a partial forward shifting of the tax can be expected (panel (b) of Figure III.1).

As is evident from Figure III.1, the tax affects either the price or the quantities demanded, or both, of the

taxed commodity, which in turn will have repercussions on other (even if nontaxed) commodities. Hence, the ultimate extent to which the tax is shifted forward cannot be determined until a complete general equilibrium analysis is undertaken. Voluminous literature on the (computable) general equilibrium effects of taxa-

tion has been developed (see, for example, Shoven and Whalley (1972)). Nevertheless, in most policy analyses of the economic impact of indirect taxes, it is not uncommon to adopt a short-run, partial equilibrium focus, in which case, it is appropriate to assume that the complete forward shifting of an indirect tax, corresponding to panel (d) of Figure III.1, will take place *in the first instance*.

The ratio of taxed to nontaxed inputs

The magnitude of the tax burden contained in the producer prices at each stage along the production-distribution chain depends on the ratio of taxed to nontaxed inputs at that stage, as well as such ratios at earlier stages. The lower these ratios, the smaller the tax burden. Food prices in many developing countries, for example, normally contain a relatively low tax component, as most agricultural inputs used in food production are tax-exempt.

The degree of price pyramiding

Price pyramiding at any given stage of production or distribution occurs when the seller raises his output price in excess of the tax burden on his inputs (see the following segment). This can occur, for example, if he has some monopolistic power and is, therefore, able to engage in the kind of pricing behavior that would allow him to derive additional profits whenever taxes are increased which are used as a convenient pretext to justify such behavior.

The number of stages in the production-distribution chain

The greater the number of stages of production and distribution a commodity passes through before reaching the final consumer, the greater the number of times taxed inputs would be subject to multiple taxation, and therefore, the higher the degree of the resultant cascading.

It is often difficult in practice to disentangle the complex interactions among the above factors in analyzing the extent of cascading contained in the price of any particular commodity. Nevertheless, some useful simple analytics can be developed for a systematic investigation of the problem.

Simple Analytics of Cascading

Tax burden shifting in a single production-distribution stage

To set the stage for a formal analysis, let p be the producer price of a commodity, k the input cost per unit of output, v the commodity's per unit value added, τ the ad valorem tax rate on taxable inputs, and γ the

fraction of total inputs subject to tax. It then follows that

$$p = v + k \cdot (1 + \gamma \cdot \tau). \quad (10)$$

Define the variable δ as the ratio of value added to input cost inclusive of the tax, that is

$$\delta = v/[k \cdot (1 + \gamma \cdot \tau)]. \quad (11)$$

Using equation (11), equation (10) can be rewritten as

$$p = k \cdot (1 + \gamma \cdot \tau) \cdot (1 + \delta). \quad (12)$$

Thus, δ can be interpreted as a markup margin on the input cost inclusive of the tax. If the input cost exclusive of the tax (k) is held constant, then from equation (11), it is clear that any proportional change in the markup margin must stem from an excess of a proportional change in the value added over that in the tax rate, that is,

$$\Delta\delta/\delta = \Delta v/v - \gamma \cdot \Delta\tau/(1 + \gamma \cdot \tau). \quad (13)$$

Equation (13) is crucial in describing the pricing behavior of the producer. To see this, first define ϕ as the elasticity of p with respect to τ :

$$\phi = (\Delta p/p)/[\gamma \cdot \Delta\tau/(1 + \gamma \cdot \tau)]. \quad (14)$$

ϕ measures, of course, the percentage change in p as a result of a 1 percent change in τ (evaluated at the point $(1 + \gamma \cdot \tau)$). But directly from equation (12), the proportional change in p is simply

$$\Delta p/p = \gamma \cdot \Delta\tau/(1 + \gamma \cdot \tau) + \Delta\delta/(1 + \delta). \quad (15)$$

Hence, by substituting equation (15) into equation (14),

ϕ can be restated as

$$\phi = 1 + (\Delta\delta/\Delta\tau) \cdot [(1 + \gamma \cdot \tau)/(\gamma \cdot (1 + \delta))]. \quad (16)$$

Equation (16) indicates that a critical factor in determining ϕ is the expression $(\Delta\delta/\Delta\tau)$, which measures the response of the markup margin δ to a change in the tax rate τ . This response is, in turn, dependent on the extent to which the producer is willing to let the value added of his output change, as given by equation (13). Two limiting benchmark cases can be identified.

Case A. Full price pyramiding ($\Delta\delta = 0$).

If the producer does not allow his markup margin to change, that is, $\Delta\delta = 0$, then it follows immediately from equation (16) that $\phi = 1$, so that a 1 percent increase in the tax rate leads to a full 1 percent rise in the output price, irrespective of the proportions of taxed to nontaxed inputs and taxed inputs to value added. A producer who engages in this type of pricing behavior would clearly have his value added increased as a re-

sult of the tax change. Indeed, it can be seen that, from equation (13), the proportional change in his value added would be equal to the proportional change in the tax rate, when $\Delta\delta = 0$.

Case B. No shifting of the tax burden ($\Delta v = -\gamma \cdot k \cdot \Delta\tau$).

If for some reason the producer is unable to shift the tax burden forward at all,¹⁰ then the incidence of any tax change would fall entirely on his value added, that is, $\Delta v = -\gamma \cdot k \cdot \Delta\tau$. Substituting this into equation (13) shows that his markup margin is changed according to

$$\Delta\delta = -\Delta\tau \cdot \gamma \cdot (1 + \delta) / (1 + \gamma \cdot \tau). \quad (17)$$

It then follows from equation (16) that $\phi = 0$, that is, there is no change in the producer price p . This result is again independent of γ .

The above two cases clearly bracket all possible outcomes on the producer price in response to a change in the tax rate. An interesting intermediate case, for example, would be that the producer merely protects his value added ($\Delta v = 0$) in the face of the tax change. In this case, from equation (13), his markup is changed by $\Delta\delta = -\Delta\tau \cdot \delta \cdot \gamma / (1 + \gamma \cdot \tau)$. Substituting this into equation (16) yields $\phi = 1 / (1 + \delta) < 1$. Hence, the proportional change in the producer price is positive but less than the proportional change in the tax rate, and, since the magnitude of δ is inversely related to both k and γ (see equation (11)), the extent of the price change is larger the higher the ratios of taxed to nontaxed inputs and taxed inputs to value added.

A synthetic rule

Quite frequently, it is useful to conduct simulation exercises to analyze the price impact of replacing one tax with another under different assumed degrees of tax burden shifting. For this purpose, it would be analytically convenient if all the different possible changes in the producer price between, and inclusive of, the above two limiting cases could be captured through varying a single parameter. The simplest procedure to achieve this is to conceptualize the pricing mechanism *as if* it operates, not according to equation (10), but according to the synthetic rule of

$$p = A \cdot (1 + \alpha \cdot \tau), \quad (18)$$

where $1 \geq \alpha \geq 0$ and A is a nonzero constant. Thus, the full price pyramiding case implies $\alpha = 1$, and the case of no tax burden shifting implies $\alpha = 0$. Varying α between zero and unity captures all possible outcomes, including the intermediate case discussed above where

the producer's pricing behavior is such that his value added is not affected by the tax change.

Cascading and multiple stages of production and distribution

With multiple stages of production and distribution, the (possibly different) pricing behavior of producers, tax rate, ratio of taxed to nontaxed inputs, and proportion of taxed inputs to value added at each stage will all have a bearing on the ultimate impact of cascading on the price the consumer faces. The analytics developed above pertaining to a single stage cannot, therefore, be generalized in a simple way to the case of multiple stages. As before, however, an interesting benchmark case can be identified under the special assumption that all producers engage in full price pyramiding behavior.

Using the same notations as before, and employing subscripts to denote the different stages, the pricing behavior of the producer in the first stage is given by

$$p_1 = (1 + \tau_1) \cdot k_1 \cdot (1 + \delta_1), \quad (19)$$

where k_1 represents his purchased inputs, which are taxed at the rate τ_1 , and δ_1 is his markup margin, as defined earlier. Hence, equation (19) corresponds to the synthetic rule given by equation (18) with $\alpha = 1$ and $A = k_1 \cdot (1 + \delta_1)$. As a buyer of the output of the producer in the first stage, the producer in the second stage purchases his inputs at the producer price of p_1 , that is, $k_2 = p_1$. If these inputs are taxed at the rate τ_2 , he would set his price according to

$$\begin{aligned} p_2 &= (1 + \tau_2) \cdot k_2 \cdot (1 + \delta_2) \\ &= (1 + \tau_2) \cdot p_1 \cdot (1 + \delta_2). \end{aligned} \quad (20)$$

Using equation (10), equation (11) can be rewritten as

$$p_2 = (1 + \tau_1) \cdot (1 + \tau_2) \cdot (1 + \delta_1) \cdot (1 + \delta_2) \cdot k_1. \quad (21)$$

Equation (12) is generalizable to any number of stages in a straightforward manner. If p_n is the producer price after n stages, and p'_n denotes the corresponding producer price in the absence of the tax, then the ratio between the two would be a measure of the degree of cascading in the producer price. From equation (21), it can be inferred that this ratio is

$$p_n / p'_n = (1 + \tau_1) \cdot (1 + \tau_2) \cdots (1 + \tau_n). \quad (22)$$

In the special case where all the tax rates are the same, as it would be with a flat-rate general turnover tax, i.e., $\tau_1 = \tau_2 = \cdots = \tau_n = \tau$, equation (22) takes the particularly simple form of

$$p_n / p'_n = (1 + \tau)^n. \quad (23)$$

Of course, a tax is also likely to be imposed on the final consumer after the last stage in the production-

¹⁰This could be owing to, for example, the demand curve that he faces being horizontal (see panel (c) of Figure III.1).

distribution chain. If p_c denotes the price inclusive of the tax imposed on the consumer at the rate τ_c , then after n stages, the consumer price would be

$$p_c = (1 + \tau_c) \cdot p_n \quad (24)$$

By definition, the impact of τ_c being imposed on the final consumer situated at the end of the chain, has no room to cascade forward.

A synthetic rule

The analytics for the case of multiple stages have been developed on the special assumption of full price pyramiding behavior on the part of the producers. This assumption, however, is not as limiting as it may seem, because it sets an upper bound to the degree of cascading. If some producers engage in less-than-full price pyramiding behavior, then the degree of resultant cascading would be less than that indicated by equation (22), or that by equation (23) with a uniform tax rate. When tax rates are in fact uniform, it is again possible to capture such an outcome by a simple synthetic pricing rule, for this case of multiple stages, similar to that for the single-stage case given by equation (18).

The impact on the consumer price of a general turnover tax at the uniform rate τ can be stated, irrespective of the number of stages in the production-distribution chain, by the following synthetic rule:

$$p_c = B \cdot (1 + \beta \cdot \tau) \cdot (1 + \tau), \quad (25)$$

where $\beta \geq 0$ is a measure of the total amount of the tax burden cascaded forward based on the producers' pricing behavior through the various stages just prior to reaching the final consumer, and B is a nonzero constant. If $\beta = 0$, then no producer along the production-distribution chain shifts his tax burden forward, and, therefore, there would be no cascading. The upper limit of β , denoted by β^* and represents the outcome of full price pyramiding behavior, is dependent on the number of stages of production and distribution. From equation (23), it is easily seen that β^* is given by

$$\beta^* = [(1 + \tau)^n - 1] / \tau. \quad (26)$$

Hence, by varying the value of β between 0 and β^* , the impact of all possible degrees of cascading can be simulated. For example, if $n = 2$, and every producer engages in full price pyramiding, then by substituting equation (26) into equation (25), the consumer price would be

$$p_c = B \cdot (1 + \tau)^3, \quad (27)$$

with B set equal to $p'_2 = (1 + \delta_1) \cdot (1 + \delta_2) \cdot k_f$.

Estimating the Degree of Cascading

In addition to simulating the impact of tax cascading on the consumer price, which is useful for comparing the price effects of alternative taxes, it is sometimes necessary to empirically estimate the degree of cascading associated with an existing tax. In general, this estimation cannot be carried out without detailed information on all the determinants of cascading discussed earlier in this chapter. If the existing tax has a uniform rate, however, the synthetic pricing rule, given in equation (25), can be used to derive an estimate for β from a few, usually readily available, aggregate data on revenue and consumption.

Let E and E' be, respectively, total taxed and tax-exempt final consumption expenditures exclusive of the existing tax. If all taxes on capital and intermediate goods are viewed as ultimately falling on consumption through cascading at varying degrees, then it must be true that, upon utilizing the synthetic pricing rule,

$$R = [(1 + \beta \cdot \tau) \cdot (1 + \tau) - 1] \cdot E + \beta \cdot \tau \cdot E', \quad (28)$$

where R is the total tax revenue. The second term on the right-hand side of equation (28) represents the amount of cascaded tax embodied in that part of consumption expenditure not subject to tax at the final consumption point. E and E' are, however, not directly observable, since consumption data are typically compiled inclusive of the tax. If F and F' denote, respectively, observable taxed and tax-exempt final consumption expenditures,¹¹ then E and E' can be derived as follows:

$$E = F / [(1 + \beta \cdot \tau) \cdot (1 + \tau)], \text{ and} \quad (29)$$

$$E' = F' / (1 + \beta \tau). \quad (30)$$

Substituting equations (29) and (30) into equation (28), it is possible to solve for β as

$$\beta = \{R - F \cdot [\tau / (1 + \tau)]\} / [\tau \cdot (F + F' - R)]. \quad (31)$$

Equation (31) provides a simple and direct formula for estimating the degree of cascading of any tax with a uniform rate.¹²

¹¹The proportion of taxed to total consumption expenditures can usually be ascertained from an examination of the consumption basket given by either household budget surveys or the consumer price index.

¹²A numerical example illustrating the use of the analytical framework developed here is provided in this chapter, relating to the price effects of replacing a general sales tax with a VAT.

Mechanisms to Alleviate Cascading

RONALD T. MCMORRAN

- *What mechanisms can be used to reduce cascading in sales taxes?*
- *What factors influence the choice of mechanism?*

There are two general types of sales taxes: single-stage taxes and multi-stage taxes. A single-stage sales tax applies only at one stage of the production-distribution chain. For example, it may only apply to sales at the manufacturing, wholesale, or retail stage. In contrast, a multi-stage sales tax applies at several stages of the production-distribution chain. Examples of this type of tax include turnover taxes and the VAT. These taxes may apply to most sales of goods and services in the economy no matter at which stage of the production-distribution chain the sale is made. Alternatively, these taxes may include all sales up to a certain stage in the production-distribution chain such as the manufacturing or wholesale stages.

Cascading is the result of tax being applied at one stage of the production-distribution chain to value added from an earlier stage that was previously subject to tax. Under a multi-stage retail-turnover tax, tax applies to all sales and no credit is available to businesses for tax paid on business inputs. The tax-exclusive price paid on a sale from a stage of the production or distribution chain will be equal to the sum of the value added in that stage and the value added and taxes paid from all preceding stages attributable to inputs used in that stage. If tax applies to sales from each stage in the production-distribution chain, there will be tax cascading.

Example 1 in Table III.1 illustrates tax cascading resulting from a multi-stage turnover tax set at a rate of 10 percent as sales proceed through four stages of the production-distribution chain. In the first stage, the primary producer makes a sale of 100 to the manufacturer. The producer has value added of 100 and the tax of 10 on the sale is solely attributable to value added at this stage. In the second stage, the manufacturer makes a sale of 210 to the wholesaler. The manufacturer has made purchases of 110 including tax and has value added of 100. On the sale, the manufacturer collects 21

Table III.1. Illustration of Tax Cascading

Example 1: 10 percent multi-stage turnover tax

	Primary Producer	Manufacturer	Wholesaler	Retailer
Sales (excluding tax at the current stage)	100	210	331	464.1
Purchases (including tax)	0	110	231	364.1
Value added:				
From current stage	100	100	100	100
Previously taxed	0	100	200	300
Previously untaxed	0	0	0	0
Tax	10	21	33.1	46.41
Of which attributable to:				
Current stage's value added	(10)	(10)	(10)	(10)
Previously taxed value added	(0)	(10)	(20)	(30)
Tax on tax	(0)	(1)	(3.1)	(6.41)
Previously untaxed value added	(0)	(0)	(0)	(0)

Example 2: 10 percent single-stage manufacturers' tax

	Primary Producer	Manufacturer	Wholesaler	Manufacturer
Sales (excluding tax at the current stage)	100	200	320	420
Purchases (including tax)	0	100	220	320
Value added:				
From current stage	100	100	100	100
Previously taxed	0	0	200	200
Previously untaxed	0	100	0	100
Tax	0	20	0	42
Of which attributable to:				
Current stage's value added	(0)	(10)	(0)	(10)
Previously taxed value added	(0)	(0)	(0)	(20)
Tax on tax	(0)	(0)	(0)	(2)
Previously untaxed value added	(0)	(10)	(0)	(10)

Source: Staff calculations.

in tax of which 10 is attributable to the current stage's value added, 10 is attributable to the previous stage's value added, and 1 is attributable to tax on tax charged on the sale at the earlier stage. In the third stage, the wholesaler makes a sale of 331 to the retailer. The wholesaler made purchases of 231 including tax and has value added of 100. Tax on the sale is 33.1 of which 10 is attributable to the current stage's value added, 20 is attributable to previous stages' value added, and 3.1 is attributable to tax on tax charged on sales at earlier stages. In the final stage, the retailer makes a sale of 464.1 to a consumer. The retailer made purchases of 364.1 including tax and has value added of 100. Tax on the sale is 46.41 of which 10 is attributable to the current stage's value added, 30 is attributable to previous stages' value added, and 6.41 is attributable to tax on tax charged on sales at earlier stages.

Generally, sales between businesses registered are not subject to tax under a single-stage sales tax. Sales from registered businesses to unregistered businesses and consumers, however, are subject to tax. Tax cascading may result when an unregistered business makes sales to a registered business and the unregistered business used taxable inputs to produce the sale.

Tax cascading under a single-stage manufacturers' tax set at a rate of 10 percent is illustrated in Example 2 in Table III.1. The example traces sales as they proceed through a production-distribution chain from a primary producer to a manufacturer to a wholesaler and then back to a manufacturer. In the first stage, the primary producer makes a sale of 100 to the manufacturer. The producer has value added of 100 and there is no tax on the sale. In the second stage, the manufacturer makes a sale of 200 to the wholesaler. The manufacturer has made purchases of 100 and has value added of 100. On the sale, the manufacturer collects 20 in tax of which 10 is attributable to the current stage's value added and 10 is attributable to the previous stage's value added that was not previously taxed. In the third stage, the wholesaler makes a sale of 320 to a manufacturer. The wholesaler made purchases of 220 including tax and has value added of 100. There is no tax on the sale. In the final stage, the manufacturer makes a sale of 420 to an unregistered business or a consumer. The wholesaler made purchases of 320 and has value added of 100. Tax on the sale is 42 of which 10 is attributable to the current stage's value added, 20 is attributable to value added that was taxed at a previous stage, 10 is attributable to value added that was not previously taxed, and 2 is attributable to tax on tax charged on the sale at the earlier manufacturing stage.

Cascading may result in distortions in relative prices by causing the effective tax rate on final sales of various goods and services to be different from statutory rates. Cascading may also result in an increase in the cost of capital to businesses when taxes cascade on capital inputs, distorting productive efficiency. There are various mechanisms to mitigate these adverse consequences of cascading in sales taxes.

Single-Stage Sales Taxes

To eliminate cascading under a single-stage sales tax, sales tax generally does not apply to sales between registered traders. This is why single-stage sales taxes are sometimes referred to as suspensive taxes—tax does not apply until a sale is made by a registered vendor to an unregistered purchaser. Essentially, these taxes “ring fence” those businesses that are producing or trading taxable goods and relieve those businesses from tax on their purchases from other taxable producers or traders.

In practice, registered vendors are obliged to charge tax on all of their sales except for sales to other registered vendors. The onus is generally on the vendor to prove to the tax authorities that he was not required to charge tax on certain sales. Normally, the tax authorities will accept the purchaser's registration number as well as other information that will identify the purchaser, such as the name and location of the business, as sufficient evidence that the vendor was not required to charge tax on the sale.

On the surface, this suspensive mechanism appears simple and easy to administer for both the government and businesses. However, this is not necessarily the case. Such a system can be subject to abuse and non-compliance. Suppliers are required to evaluate evidence provided to them by purchasers. Purchasers could provide false evidence to the supplier. In such circumstances, the tax authorities may require suppliers to remit tax that was not collected even though the purchaser provided evidence that tax was not required to be paid on the sale. This potential liability to tax can introduce some uncertainty into the tax system for suppliers.

More fundamentally, however, the system is incomplete in eliminating tax cascading. Tax relief is only provided to registered producers or traders. If some part of the production or distribution chain is not permitted to register for the tax, tax cascading may result. A common example of this problem is a single-stage manufacturers' sales tax that subjects imports and manufactured goods to tax but does not subject wholesale and retail sales, or primary production to tax. This case

has been illustrated above. Under these circumstances, primary producers may produce goods using inputs which were taxable at the manufacturer or import stage. If these goods are subsequently used by manufacturers or importers to produce taxable goods, then value added that was taxed at an earlier stage in the production-distribution chain will be subject to tax again, thereby resulting in tax cascading.

Multi-Stage Sales Taxes

By their very nature, turnover taxes are cascade taxes because tax applies at many stages of the production-distribution chain without any mechanism to remove tax on business inputs. Some jurisdictions have attempted to alleviate cascading in turnover taxes by allowing relief for tax paid on some business inputs. This is usually accomplished by allowing businesses to earn a credit for tax paid on certain items. These items may include capital purchases or other inputs into a production process. In some cases, relief may not be provided for inputs that are attributable to general overhead or that may not be attributable to the production of taxable goods.

Partial relief does remove some elements of cascading in a turnover tax system. Such relief, however, does not eliminate all cascading. Some jurisdictions have used partial relief as a means of experimenting with the credit mechanism to learn its operation and functioning, as a step toward the introduction of a VAT.

Multi-stage noncumulative taxes or VATs are those where the trader pays net tax on value added at each stage. There are two basic methods. The first method, the credit-invoice method, allows traders to credit tax paid on their purchases against tax collected on their sales in determining the net tax payable to the treasury. The second method, the subtraction method, is used only in a few countries and requires traders to calculate value added as the difference between sales and purchased inputs and remit tax calculated on that difference.¹³ VATs are more effective in removing tax cascading on supplies between registered traders than single-stage suspension taxes because there are fewer opportunities for avoidance and noncompliance.

Unlike a suspensive system, under the credit-invoice method of VAT, all sales that are made by registered traders are subject to tax and only registered traders are permitted a credit for tax paid on inputs. Under such a system, the onus is on registered traders to

prove that they are eligible to claim a credit for tax paid on inputs. Sufficient evidence of tax paid on inputs is an invoice that documents the taxable transaction for which a credit claim is being made.

The credit-invoice scheme is one of the main benefits of a VAT. It provides an audit trail that makes tax administration easier and supports voluntary compliance with the tax. Such a system is superior to the suspensive system. Under the suspensive system, the tax authorities are required to assess suppliers who did not charge tax in circumstances where tax should have been collected by a supplier on a sale. In contrast, under the credit-invoice system, the tax authorities can deny credits in circumstances where insufficient or incorrect evidence was supplied to justify a credit claim.

The credit-invoice mechanism, however, does not completely remove cascading if there are exemptions. As noted earlier, the net tax calculation of a taxable business that only purchases taxable inputs is the difference between tax on its sales and tax paid on its purchases—that is, the tax value of the business' value added. If the business, however, purchases some exempt inputs, then no tax would be paid on its exempt purchases and no credit would be claimable on these purchases. Thus, the net tax calculation becomes the tax value of the business' value added plus the tax value of exempt inputs. The value of the exempt inputs will be made up of the sum of the value added from all previous stages in the production-distribution chain attributable to those exempt inputs. If some of that value added was previously subject to tax, there will be cascading. The cascading consequence of exemptions in a VAT under the credit-invoice method is numerically illustrated later in this chapter.

A Comparison Between the Sales Tax and a VAT

RONALD T. MCMORRAN

- *What are some of the practical differences between sales taxes and VATs?*

There are many differences between a single-stage sales tax and a VAT. These differences relate to administrative and operational aspects of the two types of taxes. These aspects affect administration and compliance costs, tax evasion, and the timing of revenue flows to the treasury. Another issue is the treatment of services. In concept, single-stage sales taxes and VATs can treat services equally. In practice, this has not been

¹³For a detailed discussion of the credit-invoice and subtraction methods, see the section on "The Credit Versus Subtraction Method" later in this chapter.

the case. This section discusses differences between a single-stage sales tax and a VAT.¹⁴

Location of the Tax Point in the Production-Distribution Chain

The experience of many countries provides strong evidence that any sales tax that stops short of the retail level is basically unsatisfactory and is subject to endless controversy. The problems relate to the tendency of firms to shift various activities beyond the impact of the tax, the inability to treat different distribution systems equally for tax purposes, the inability to tax imports and domestic goods equally, and the relatively high tax rate necessary for a given revenue.¹⁵

For example, under a manufacturing level VAT, a fully integrated manufacturer/retailer would be required to calculate output tax on the value of its retail sales, whereas a manufacturer who makes sales to a middle man would only be required to calculate output tax on the value of sales to the middle man. Thus, an incentive is created to shift economic activity to the untaxed stages of distribution. At the same time, disincentives are created against the integration of the functions of manufacturing, wholesaling, and retailing. Similar problems arise with a single-stage manufacturer's tax. Further, most manufacturer level taxes have developed complex and confusing formulas for mark-ups from ex-factory prices or discounts from retail prices to calculate taxable wholesale prices. Over time, these rules become increasingly elaborate.

In addition, the tax base of a manufacturing stage VAT will be narrower than a retail-stage VAT. As a result, for a given amount of revenue, a retail VAT requires a lower rate than a manufacturing VAT. To the extent that the incentive for tax evasion is positively related to the tax rate, a retail VAT will thus have a lower incentive for tax evasion than a manufacturer's VAT. Also, the share of tax paid by any one taxpayer is also lower under a retail VAT, so that such a tax system is less reliant on the compliance of a few relative to a manufacturing VAT.

In countries with a tradition of keeping business records and high tax morality, it is feasible to apply sales taxes at the retail level. For these countries, the question is whether a retail-level tax should be a single-stage retail-sales tax or a multi-stage retail VAT.

In countries without a tradition of business record keeping or with low tax morality, it is not feasible to

extend sales taxes to the retail level. For these countries, there are two key tax policy questions: at what stage in the production-distribution chain should the tax be applied, and should the tax be a single-stage sales tax or a VAT? Generally, the broadest possible stage to apply a sales tax in these countries is at the manufacturing/import stage because the next stage in the production-distribution chain—the wholesale trade stage—is difficult to define.¹⁶ Thus, the remaining policy question for these countries is to determine whether a single-stage sales tax or a VAT should be levied.

Timing of Revenue Flows

In principle, a single-stage sales tax and a VAT that have the same tax base should have the same net revenue effect and there should be little difference in the timing of their revenue flows. Tables III.2 and III.3 show the revenue flows to the government under a retail-stage VAT and a single-stage retail-sales tax, respectively. Usually, under a VAT, tax payable on sales made in a reporting period is due immediately after a reporting period ends and credit for input tax paid in a reporting period is claimable immediately after the end of the reporting period in which tax is paid. As a result, business to business sales will generally offset each other in government accounts for a reporting period and net VAT revenue in a period will only be the tax paid on final sales to consumers. This is the same as revenue flows to the government under a single-stage retail-sales tax. Differences in the timing of government revenue may arise if traders have different return periods under a VAT.

Tables III.2 and III.3 also illustrate how revenue flows differ from the attribution of tax revenue to a stage of production. Under a single-stage retail-sales tax, revenue is attributed to a single stage—the retail stage. In contrast, under a VAT, tax revenue is attributed to each stage in the production-distribution chain as tax is applied to each stage's value added.

Administration and Compliance Costs

Administration and compliance costs under a single-stage sales tax and a VAT, which both extend to the same level in the production-distribution chain, are not likely to differ substantially for two reasons. First, tax administration has to be vigilant in its administration of either type of tax. Effective control of the tax system re-

¹⁴See Cnossen (1987).

¹⁵See Due (1985).

¹⁶In these countries, while it may not be operationally feasible to extend a sales tax through the retail level, the same problems with pre-retail taxes are encountered.

Table III.2. Illustration of Government Revenue Flows Under a VAT: Ten Percent Retail-Stage VAT

Period 1: \$100 sale from primary producer to manufacturer			
Tax payable on sale	10		
Tax credit claimed on purchase	-10		
Net revenue to government	0		
Period 2: \$200 sale from manufacturer to retailer			
Tax payable on sale	20		
Tax credit claimed on purchase	-20		
Net revenue to government	0		
Period 3: \$300 sale from retailer to consumer			
Tax payable on sale	30		
Tax credit claimed on purchase	0		
Net revenue to government	30		
Net tax calculations at each stage of production			
	Primary Producer	Manufacturer	Retail Trade
Sales excluding tax	100	200	300
Purchases excluding tax	0	100	200
Tax on sales	10	20	30
Tax on purchases	0	10	20
Net tax	10	10	10

Table III.3. Illustration of Government Revenue Flows Under a Retail-Sales Tax: Ten Percent Retail-Sales Tax

Period 1: \$100 sale from primary producer to manufacturer			
Tax payable on sale	0		
Tax credit claimed on purchase	0		
Net revenue to government	0		
Period 2: \$200 sale from manufacturer to retailer			
Tax payable on sale	0		
Tax credit claimed on purchase	0		
Net revenue to government	0		
Period 3: \$300 sale from retailer to consumer			
Tax payable on sale	30		
Tax credit claimed on purchase	0		
Net revenue to government	30		
Net tax calculations at each stage of production			
	Primary Producer	Manufacturer	Retail Trade
Sales excluding tax	100	200	300
Purchases excluding tax	0	100	200
Tax on sales	0	0	30
Tax on purchases	0	0	0
Net tax	0	0	30

quires extensive examination of books and records. For example, estimates suggest that the number of traders under either system at the retail level does not differ significantly. Under a single-stage tax, businesses that wish to remove the tax from their inputs are required to register for the tax because only registered traders are eligible for tax relief on business purchases. Under the VAT, no distinctions need to be made between the sales to different types of purchasers; all sales are taxable. The need to make distinctions between types of purchasers under a single-stage sales tax and to keep records that distinguish exempt sales to registered traders and taxable sales to nonregistrants makes single-stage sales taxes more complicated than they appear.¹⁷

Second, traders' compliance costs may be less in aggregate under a single-stage sales tax than under a VAT because a single-stage sales tax requires less extensive records—under a single-stage sales tax, only records of sales are required to be kept, whereas under a VAT, records are required to be kept for both purchases and sales. This difference in compliance costs is trivial, however, if commercial law or other taxes require complete sets of books and records that include purchase and sale ledgers.

Tax Evasion

One of the most contentious issues in this debate is the question of whether the VAT is more resistant to tax evasion. There are many factors, common to both taxes, that affect the level of tax evasion in a given country, including the level of tax morality and ability of the tax administration to enforce the tax. Neverthe-

¹⁷See Tait (1988).

less, there are features of both taxes that may lead to different levels of tax evasion.

Both types of taxes are subject to evasion in the shadow economy. Under certain conditions, the two types of taxes are subject to different forms of evasion. Under a VAT, registered traders can reduce their tax liabilities by claiming, in their tax returns, credit for tax that was not paid on purchases. Under a single-stage sales tax, nonregistered purchasers may provide false information to sellers to get tax relief, thereby evading tax. The key difference between these forms of evasion is that under a VAT, the government controls the refund of input tax whereas, under a single-stage sales tax, the government never receives the tax.

Another key issue is the extent to which tax revenues are at risk. Under a single-stage sales tax, tax revenue is only collected at one stage of production or distribution in the economy. Tax evasion thus results in a loss of the entire amount of tax that would be collected at the point of taxation. For example, retail-sales taxes are collected from the weakest link in the distribution chain. Many retail sales require no invoice and the only evidence may be, for example, till rolls. Cash sales are common.

In contrast, VATs may be collected at several levels of production or distribution. Tax revenue is generally only at risk for the tax on value added at the stage in production or distribution where the tax is being evaded. And if this evasion occurs prior to the retail level under a retail VAT, then this will reduce the credit that the purchaser of the intermediate product can claim. Thus, this revenue should eventually be caught. However, "the VAT provides one opportunity for fraud not available in other forms of sales tax: fictitious claims for excessive credits and rebates, particularly through the use of counterfeit invoices."¹⁸

A retail VAT provides a better audit trail than a single-stage retail-sales tax. The use of invoices throughout the system gives auditors an opportunity to create a better series of checks. This greatly increases the risk of detection under the VAT.¹⁹ A large portion of tax revenue is typically collected at pre-retail stages; businesses at these stages are typically larger than retail businesses, keep better records, and are generally less prone to evasion. Evasion of a VAT at the retail level results in the loss of only the portion of the tax that is paid on the retail margin (unless the retailer manages to get credit for tax paid on purchases of goods but does not report tax on sales).²⁰

The Taxation of Services

In principle, it is equally easy to tax services under a single-stage sales tax as under a VAT. In practice, however, services have been treated differently under single-stage taxes and VATs that have comparable coverage, especially at the retail level. In many cases, single-stage taxes do not apply to services. In other cases, single-stage taxes are imposed on specific services, such as hotel rooms or insurance premiums. VATs at the manufacturer-importer level often include selected services, such as telecommunications and transportation. At the retail level, VATs typically include all services except for a few exempt services, such as health care, education, social services, and financial services. These few services, however, represent a significant portion of value added attributable to services.

Traditionally, services have been difficult to tax because many services are rendered at the final stage of the production or distribution process. Usually, the labor content as a proportion of the final price is high, as is the degree of specialization. As a result, these services are often provided by many small-scale establishments, which may be difficult to reach administratively. Another complicating factor is that many services are often sold for business and personal use. At the final stage, taxable personal use is extremely difficult to separate from exempt business use, while cascading results if both uses are taxed across-the-board. Because of these reasons, services have not typically been included in pre-retail level sales taxes.²¹

For retail-level taxes, there are two reasons why it is easier to accommodate services under a VAT than under a single-stage tax. First, businesses that provide services to consumers also often provide services to other businesses that would like to claim refunds of tax on their inputs so these businesses wish to be part of the VAT. Second, mixed-use services for business and private consumption pose far fewer problems under a VAT than under a single-stage tax. Under a VAT, businesses' services and private consumption are taxed in full. There is no need for a seller to determine if tax should be suspended as under a single-stage tax. Rather, the purchaser must satisfy the tax authorities that a credit can be claimed for tax paid on the purchase of the service. Relative to a single-stage tax, this removes an element of uncertainty and reduces the potential for tax evasion.²²

¹⁸See Gillis, Shoup, and Sicut (1990).

¹⁹See Tait (1988).

²⁰See Due (1985).

²¹See OECD (1988).

²²See OECD (1988).

Value-Added Tax

HOWELL H. ZEE

Selected Issues in Designing a VAT

- *What are the alternative variants of a VAT, and how do they relate to each other?*
- *How is the origin principle different from the destination principle, and what economic implications are entailed by each?*
- *What are the possible price effects of introducing a VAT, and how are they measured?*

There are three possible variants of a VAT: the product-type (P-VAT), the income-type (I-VAT), and the consumption-type (C-VAT).²³ Each variant, in turn, can be implemented under two possible principles: the origin and destination principles; and by using two main methods of computation: the credit-invoice and subtraction methods. Hence, in considering the introduction of a VAT, the choice of an appropriate VAT variant, principle, and computation method must be made. In addition, a variety of other VAT design issues must also be addressed. These include the number of tax rates, the scopes of zero-rating and exemptions, the level of exemption threshold, and possible special mechanisms to deal with businesses which are to be exempt. If the prospective VAT is to replace some existing taxes, transitional arrangements to grant relief to stocks and inventories to compensate for the existing tax elements embodied in their values might also be required. Policy decisions on the above issues will have an important bearing on both the VAT's revenue yield and its economic consequences.

This section provides a brief examination of the relative merits and shortcomings of the three VAT variants and the two tax principles. It also discusses the potential price effects of introducing a VAT. The economic implications of alternative methods of VAT computation, the number of tax rates, zero-ratings, and exemptions are considered in the next section on credit versus subtraction method. Another section, later in this chapter, illustrates how the base of a VAT can be estimated.

²³While the C-VAT is the most prevalent variant adopted in international practice, a discussion of all three variants is important in understanding their relative merits and shortcomings.

VAT Variants

The relationship among the three variants of VAT can be best understood by comparing the income and expenditure aggregates in the national income accounts. Expenditures on the gross domestic product (GDP) consist of final private consumption expenditure (C), gross investment expenditure (I), final government nonwage expenditure on goods and services (G_c), government expenditure on wages and salaries (G_w), and the trade balance (the values of exported (X) less imported (M) goods and nonfactor services):

$$GDP = C + I + G_c + G_w + (X - M), \quad (32)$$

while gross domestic income (GDI) is the sum of factor income payments (wages, interest, profits, etc.)—commonly referred to as the value added (V) of production—and depreciation (D):

$$GDI = V + D. \quad (33)$$

Equality between income and expenditure gives the basic national income accounting identity:

$$GDP = GDI. \quad (34)$$

Equation (34) can be stated in terms of either factor cost (i.e., exclusive of indirect taxes net of subsidies) or market prices (i.e., inclusive of indirect taxes net of subsidies).

P-VAT

Broadly speaking, a P-VAT taxes all expenditures (except government wage expenditure, which is infeasible to tax under any variant of VAT) on GDP if implemented on the origin principle, and on GDP adjusted for the trade balance if implemented on the destination principle. Assuming for the time being that the origin principle is employed, so that exports, being of domestic origin, are taxed but imports, whose value originated from abroad, are not (see below for a detailed discussion). Then the base of a P-VAT is simply the sum of all expenditures on GDP (hence its name as a product-type VAT) net of government wage expenditure. From equation (32), this base can be expressed as

$$\text{base of P-VAT} = GDP - G_w = C + I + G_c + (X - M). \quad (35)$$

I-VAT

Gross investment expenditure, which is part of the base of a P-VAT, reflects an economy's actual aggregate expenditure on capital goods (i.e., gross capital formation) in a given period. Part of this expenditure, however, is used to compensate for capital goods that have been consumed or depreciated. While depreciation as such is merely a bookkeeping entry and does not represent an actual economic transaction, it does affect the computation of profitability, and thus the value added, of businesses. An I-VAT excludes depreciation from its base; it therefore taxes the net, rather than the gross, investment expenditure:

$$\text{base of I - VAT} = \text{GDP} - G_w - D = C + (I - D) + G_c + (X - M). \quad (36)$$

From equations (33) and (34), however, it is clear that the base of an I-VAT can be alternatively expressed as

$$\text{base of I - VAT} = \text{GDI} - G_w - D = V - G_w \quad (36')$$

The second equality in equation (36') indicates that the base of an I-VAT is simply the sum of factor income payments (net of government wage expenditure), hence its name as an income-type VAT.²⁴

C-VAT

If, in addition to depreciation, expenditures on capital goods which contribute to a net augmentation of the capital stock are also not taxed, then the entire gross investment expenditure would in effect be excluded from the tax base. The resultant base would be the base of a C-VAT:

$$\text{base of C - VAT} = \text{GDP} - G_w - I = C + G_c + (X - M). \quad (37)$$

A Comparison of the Three Variants

It is clear from the above that the P-VAT has the broadest base among the three variants; the C-VAT has the narrowest. The broadness of the P-VAT base is bought, however, at a potentially high economic price. By imposing a tax burden on gross purchases of capital goods without giving any relief even on depreciation, the P-VAT exerts a strong discouragement to investment. Furthermore, to the extent that businesses succeed in shifting at least part of their capital costs

²⁴In national income accounting terminology, subtracting depreciation from gross domestic product (income) results in net domestic product (income). When net factor income from abroad (abstracted from the discussion here for simplicity) is added to net domestic income, the resultant sum is commonly referred to as simply national income, which in turn can be stated on the basis of either factor cost or market prices.

forward, taxing capital goods would result in cascading if the P-VAT uses the credit-invoice method.²⁵ By similar reasoning, these shortcomings, albeit to a lesser extent, are also present with the I-VAT.

While providing the narrowest of the three tax bases, the C-VAT, being a general tax on consumption (inclusive of net exports if implemented on the origin principle, as shown above), is economically the most neutral (as it generates no distortion in the production process between capital and other inputs) and is, therefore, generally regarded as the superior variant among the three. It is also the most widely adopted variant in countries that have a VAT. It does, however, require the highest tax rate to achieve a given revenue yield. For this reason, some countries have attempted to expand the base of the C-VAT by taxing capital goods partially.²⁶ It is easy to see that, depending on the fraction of capital goods that is deemed taxable, such an expansion of the C-VAT base amounts to a modified version of I-VAT.

If the trade balance, that is, $X - M$, is removed from each of the three tax bases expressed above, then all three VAT variants would be converted to the destination principle. In this case, it follows immediately from equation (28) that the base of the C-VAT becomes $C + G_c$, which corresponds to the total sales at the retail level. Hence, in terms of tax policy, a C-VAT implemented under the destination principle is equivalent to a retail-sales tax. The administrations and collection mechanisms of the two taxes are, of course, quite different.²⁷

Origin Versus Destination Principle

Basic concepts

A VAT can be implemented under either the origin or the destination principle.²⁸ Under the former, the VAT is imposed on the value added of all taxable products (henceforth taken to encompass both goods and services) that are produced domestically; under the latter, the VAT is imposed on the value added of all taxable products that are consumed domestically. Obviously, the two principles are identical in a closed

²⁵See earlier section on tax cascading: concept and measurement for a discussion of forward shifting and cascading, and the following section for a discussion of the credit-invoice method.

²⁶In practice, this is usually achieved, in a VAT that uses the credit-invoice method, by phasing the provision of tax credits on capital goods over a number of years (as opposed to providing the credits immediately).

²⁷See an earlier section of this chapter for a more detailed comparison between a retail-sales tax and a VAT.

²⁸A third principle, known as the restricted origin principle, is discussed below.

economy. In an open economy, the difference between them lies solely in their treatments of imports and exports: exports are taxed but imports are not under the origin principle, while just the converse holds under the destination principle.

It is important to note that the distinction between the two principles is based on the *location* of production and consumption,²⁹ and not on the *type* of products being produced or consumed—the latter being the basis for distinguishing between the P-VAT and the C-VAT, as discussed above. Hence, contrary to popular belief, there is no conceptual incompatibility in implementing a C-VAT under the origin principle or a P-VAT under the destination principle. With a C-VAT, for example, capital goods, whether imported or locally produced, are not taxed under either principle as long as they are purchased for domestic use, but will be taxed if exported under the origin principle. Exported capital goods are, of course, not taxed with a C-VAT under the destination principle. A matrix of the tax treatments of capital goods under the four combinations of the two VAT variants and two tax principles is given below.

	C-VAT	P-VAT
Origin	Taxed if exported; not taxed otherwise.	Not taxed if imported; taxed otherwise.
Destination	Not taxed.	Not taxed if exported; taxed otherwise.

Hence, capital goods completely escape taxation only under the combination of C-VAT and destination principle.

Border tax adjustments and valuation of traded products

Since a destination-based VAT taxes imports but not exports, it requires border tax adjustments, that is, the VAT must be applied on (removed from) products as they enter (leave) the country. Surprisingly, these border tax adjustments require no special attention be paid to the valuation of traded products for VAT purposes. Irrespective of the method of computation (credit-invoice or subtraction) used, exporters have no incentive to under-declare export values, as exports are not taxed. On the imports side, any revenue lost owing to under-declaration of import values is fully recovered at the later stages of the production-distribution chain, unless the importing activities are directly undertaken by consumers (e.g., cross-border shop-

ping).³⁰ The situation is exactly reversed, however, with an origin-based VAT.

As imports are not taxed but exports are taxed just like domestic sales, no border tax adjustments are necessary under the origin principle. But since an origin-based VAT taxes the domestic value added of taxable products, and the values of imported products are embedded in the sales of domestic producers, import values must be properly ascertained so that they can be removed from the tax base.³¹ The proper valuation of exports is equally important, as any revenue lost resulting from incorrect export declarations is never recovered. For tax purposes, then, the valuation problem under the origin principle is primarily one of safeguarding against over-declarations by importers and under-declaration by exporters.

A comparison of the two principles³²

- *Distribution of the global tax base.* There is clearly an important implication regarding the distribution of the global tax base among trading countries in choosing between the origin and destination principles, as the value added of exports is part of the tax bases of the exporting countries under the former, but is part of the tax bases of the importing countries under the latter. Hence, under the origin principle, a trade surplus (deficit) would expand (reduce) a country's tax base; exactly the reverse would hold under the destination principle. Only if every country's trade account is balanced (though not necessarily with each other) would such distributive consequences be absent.

- *Production and consumption efficiencies.* Apart from the distribution of the global tax base, would the two principles entail different efficiency implications for global production and consumption? Obviously, if all countries have the same VAT rate,³³ the two principles would yield identical outcomes, since the tax rate on any taxable product would be the same regardless of where it is produced or consumed. If countries have

³⁰For a demonstration of how under-declared values of products in one stage would be caught in subsequent stages in the production-distribution chain, see the section on credit vs. subtraction method. That consumers could benefit from under-declaring the values of products they directly imported is due entirely to their status as nonregistered VAT payers. Clearly, such benefits could also accrue to others who are specifically exempt by the VAT system.

³¹An origin-based VAT using the credit-invoice method would require an imputation of tax credits applicable to imports.

³²See Berglas (1981); Cnossen (1987); Frenkel, Razin, and Sadka (1991); Shibata (1967); and Sinn (1990) for various discussions.

³³For simplicity, it is assumed here that the VAT systems in different countries can differ, if at all, only in terms of their VAT rates, with each country having a single rate internally. Complications arising from violating this assumption are noted below.

²⁹In this sense, the distinction is fully analogous to that between the residence and source principles in income taxation.

different VAT rates, however, the two principles would, in general, have different efficiency implications.

Under the destination principle, producer prices of every traded product are equalized across countries through free trade (since a product entering a country is free from the VAT of the exporting country), but with different VAT rates, its consumer prices, and therefore the relative consumer prices between it and nontraded products, would be different in each country, thus resulting in inefficient global consumption.³⁴ Under the origin principle, consumer prices of every traded product are equalized across countries through free trade (since a product entering a country bears the VAT of the exporting country), but with different VAT rates, its underlying producer prices, and therefore the relative producer prices between it and nontraded products, would be different in each country, thus resulting in inefficient global production. Hence, a movement from one tax principle to the other essentially entails a trade-off between global consumption and production inefficiencies, when VAT rates are not uniform across countries.

Note that the relative producer and consumer prices between any pair of traded products within a country is always the same with a single internal VAT rate. This implies that the equalization of relative producer prices among tradable products across countries under the destination principle is the same as equalizing their relative consumer prices. Similarly, under the origin principle, the equalization of relative consumer prices among tradable products across countries is the same as equalizing their relative producer prices. Therefore, if all products are tradable, neither tax principle would produce any global consumption or production inefficiency.

• *Equivalence and nonequivalence under flexible prices.* A presumption in the above efficiency analyses is, of course, that all prices are flexible so that the relevant producer and consumer prices can be equalized through trade. Hence, in the absence of nontradable products, both the origin and destination principles would entail no inefficiency even when VAT rates differ across countries. A related (but different) proposition is that, as long as all prices (and exchange rates) are flexible, a switch from one tax principle to the other would entail no change in the cross-country production patterns. This well-known equivalence result is, however, predicated on two crucial assumptions.

First, it assumes that all tradable products are taxed at the same VAT rate within a country. If this does not

³⁴It is assumed for simplicity that all traded products are taxable, while all nontraded products are not taxed.

hold, a switch in tax principles would produce complex responses in production and consumption patterns. In reality, of course, VAT systems among countries can differ not only in terms of rates, but in other structural aspects as well, thus rendering the outcomes even murkier.

Second, different VAT rates across countries would impose different burdens on factor incomes, through their differential impacts on producer prices. For example, by equalizing the consumer prices of a tradable product across countries, the origin principle, as noted earlier, would give rise to different underlying producer prices. Under the destination principle, differences in consumer prices of a tradable product across countries, generated by differences in their VAT rates, could also be translated into differences in its producer prices through adjustments in exchange rates. In either case, factor incomes would not be the same across countries, which in turn would induce international factor movements and consequently alter countries' production patterns. Hence, unless factors are immobile, the equivalence result would not hold in general.³⁵

• *International practice.* Almost all countries in the world that presently have a VAT have implemented it on the destination principle.³⁶ The reason is probably twofold. First, the origin principle, which allows imports entering a country to bear the VAT burdens of exporting countries, is likely to lead to undesirable tax competition, with the clear implication that flexible prices and exchange rates are not being viewed as adequate mechanisms for alleviating such behavior among trading countries. The destination principle, in contrast, is regarded as effective in ensuring that traded products contain no VAT elements of the exporting countries. Second, while the destination principle requires border tax adjustments, such adjustments can be carried out with relative ease, and in any case, they seem to be a small price for circumventing the potential valuation problems associated with the origin principle.³⁷

• *Restricted origin principle.* The restricted origin principle is primarily of interest only to countries that are members of a customs or economic union, within which border controls on trades among union members

³⁵It is sometimes noted that the validity of the equivalence result is also predicated on the assumption that all countries have a balanced trade account. With flexible exchange rates, however, this is more in the nature of an equilibrium condition than an additional assumption.

³⁶The most notable exceptions being the republics of the former Soviet Union (see below).

³⁷Another commonly cited reason is that the destination principle would improve the trade balance, but its empirical support is not well established.

are either absent or ineffective by default, or their removal is a stated objective of the union. Because of the required border tax adjustments, the implementation of the destination principle is generally regarded as infeasible without border controls. If union members implement their VAT systems under the origin principle regarding intra-union trades, but under the destination principle regarding trades with nonunion members, the restricted origin principle is said to apply. This is the principle on which the VAT systems in the republics of the former Soviet Union are presently based, and toward which the VAT systems in the European Community (EC) countries are aiming.³⁸

Under the restricted origin principle, VAT rate divergence among union members is, of course, very much an issue (just as it is under the general origin principle). This problem can be apparently overcome, however, by a clearinghouse mechanism whereby the importer in a member country is given credit, under the regular credit-invoice method, for the VAT paid on his imports in the exporting member countries. Such foreign credits given would be tallied by every union member against every other union member, and the net claims on each member would be settled by a clearinghouse. In effect, such a mechanism would restore the substantive content of a destination-based VAT, with border tax adjustments being shifted from border controls to the clearinghouse. A proposal along these lines has been outlined by the EC for use with the definitive VAT system after the transitional period expires.

In addition to the need for setting up a new bureaucratic apparatus to administer the clearinghouse, however, it has been noted that this approach has a number of other shortcomings, including the existence of incentives for member countries to under-declare

their exports and over-declare their imports, and the necessity for some rate conformity among members is not entirely obviated. Since cross-border purchases by nonregistered VAT payers, that is, consumers, are effectively taxed at the rates prevailing in the origin countries, their volume could be substantial if rate differentials across member countries are significant.³⁹

In terms of economic efficiency, it can be shown that a VAT implemented under a genuine restricted origin principle (i.e., one without the clearinghouse mechanism) would be identical to that implemented under the general origin principle only if all member countries adopt the same rate, even if all prices and exchange rates are flexible and all trade accounts are bilaterally balanced among members.

Price Effects of a VAT ⁴⁰

Impact on the rate of inflation versus the price level

A common concern in many countries contemplating the introduction of a VAT is that it may produce an inflationary impact, even if it is designed to replace one or more existing taxes in a revenue-neutral manner. This concern usually stems from the prospective VAT typically having a much broader base than the taxes it replaces, so that many untaxed items under the existing system will be taxed under the VAT. The validity of this concern can be examined under two alternative interpretations of the term "inflationary impact."

If inflationary impact is taken to mean a sustained increase in the *rate of inflation*, then the concern would be conceptually misguided. The introduction of a VAT (or any tax, for that matter) can never, by itself, lead to a sustained increase in the rate of change in the price level; such a change in the inflation rate can only be produced by an expansionary monetary policy under all circumstances. If, however, the term is interpreted as a once and for all increase in the *price level* (or a one-period increase in the inflation rate), then

³⁸The directive on the removal of fiscal frontiers in the EC (Directive 91/680/EEC), adopted by the Council of the European Communities in December 1991 and went into force on January 1, 1993, provides for a period of transitional arrangements whereby the VAT on intra-EC trades would still be based on the destination principle, but their monitoring would no longer be based on physical controls at internal borders. Instead, the monitoring would be carried out on the basis of a new reporting system of statistics on intra-EC trades (Regulation (EEC) No. 3330/91) and new requirements on administrative cooperation among EC countries (Regulation (EEC) No. 218/92). In effect, a version of the so-called deferred payment scheme (see below) would be adopted.

The transition period is envisioned to last until December 31, 1996 (with possible extensions) after which a definitive system of origin-based VAT would be implemented for intra-EC trades (i.e., a VAT based on the restricted origin principle), together with a clearinghouse mechanism. As explained below, however, the adoption of such a mechanism would result in a VAT that resembles a destination-based system in its economic impact, except for those intra-EC trades, e.g., sales of cars and distance (mail-order) sales, explicitly excluded from the mechanism.

³⁹It should perhaps be noted that there is an alternative method, known as the deferred payment scheme and has been used in the Benelux countries, for implementing a destination-based VAT without border controls. It essentially involves taxing imports, not at the point when they physically enter the country, but at the next stage of their production-distribution chain, which is automatically accomplished through the catching-up property of the credit-invoice method (see section on credit vs. subtraction method for a discussion of this property). Exporters are given tax refunds on the basis not of documents from customs authorities, but of other proper documentary proofs that products have in fact been exported.

As noted earlier, a version of the above deferred payment scheme has now, in effect, been adopted by the EC during the transitional period until a definitive VAT system is implemented.

⁴⁰Tait (1988) contains a good discussion on this topic.

whether the VAT is inflationary in this sense would depend on a number of factors.

The conventional conclusion is that, *ceteris paribus*, a VAT that is introduced in a revenue-neutral manner would have no impact on the aggregate price level, since the aggregate demand in this case is unchanged. Similar reasoning would then suggest that a revenue-enhancing (revenue-losing) VAT would lead to a decline (rise) in the aggregate price level, since it corresponds to a contractionary (expansionary) fiscal policy stance. There are, however, two problematic aspects to these conclusions: conceptually, they neglect a possible supply response to the VAT's introduction; and operationally, they overlook that measuring any change in the price level is often based on a price index, such as the consumer price index (CPI), with historically fixed weights.

Supply response

The conventional conclusion of no aggregate price change following the introduction of a revenue-neutral VAT is predicated on the assumption that the VAT induces no aggregate supply response and, therefore, the budget constraint for the private sector remains unchanged. If, however, the VAT entails a lower degree of distortion in production efficiency than the taxes it replaces—which is most likely to be the case as this is commonly the primary reason for introducing the VAT in the first place—then there is a strong presumption that the tax switch would elicit a supply response that would exert a downward pressure on the price level even under the condition of initial revenue neutrality.

Historically fixed weights in a price index

The replacement of an existing tax with a VAT will almost always change the structure of relative prices in the economy, even if the revenue yield remains the same after the tax switch. For the no price effect to hold, the expenditure patterns of the private sector must shift immediately and in such a way within the same overall budget constraint so as to produce an unchanged aggregate price level. Operationally, however, the interest of the policymaker is typically focused on measuring the price effect based on a widely understood price index, such as the CPI. Since an index of this type invariably has historically fixed weights, price calculations based on it cannot capture the equilibrium adjustments in expenditure patterns necessary to produce the constant price outcome. Hence, as long as a fixed-weight price index has to be used to calculate aggregate price effects, the direction in which the index would change after the tax switch is *a priori* uncertain, depending as it must be on the pattern of the change in relative prices.

Simulating the change in the CPI: a numerical example

To illustrate the nature of calculating the price effect of a tax switch based on the CPI by means of a concrete numerical example, consider the case of replacing an existing general sales tax (GST) of 11 percent with a VAT of 13 percent. Suppose that 52 percent of the consumption basket in the CPI is exempt from the GST, but the scope of exemptions would go down to 31 percent of the basket under the prospective VAT. Under either the GST or the VAT, the consumer prices of tax-exempt items would contain some tax elements due to cascading. For the taxed items, however, cascading would be present under the GST but largely eliminated under the VAT.⁴¹ Hence, the outcome of the price calculations would critically depend on the degree of cascading present in the economy.

It will be recalled from the section on tax cascading: concept and measurement that, irrespective of the number of stages in the production-distribution chain and the producer's pricing behavior, the degree of cascading, β , can be embodied in the following synthetic rule for simulation purposes:

$$p_c = B \cdot (1 + \beta \cdot \tau) \cdot (1 + \tau),$$

where τ is the relevant tax rate, p_c denotes the consumer price inclusive of the tax, and B is a positive constant. The impact of a tax at the rate τ on the consumer price can then be simulated with alternative values of β . Table III.4 provides illustrative calculations, based on such a synthetic rule with B normalized to unity, of the impacts on the CPI of the GST and the VAT in the above example.

Column 8 of Table III.4 shows that the GST element in the CPI ranges from 8.2 percent with $\beta = 0.25$ to 16.9 percent with $\beta = 1$, while column 15 of Table III.4 shows that the VAT will increase the CPI from 10 percent to 13 percent over the same range of β values. An essentially neutral price impact would be achieved if $\beta = 0.5$, where the removal of the GST is shown to reduce the CPI by 11.1 percent and the VAT's introduction to increase the CPI by 11 percent. Of course, the precise price impact of replacing the GST with the VAT can be determined only after the true value for β is ascertained. A method for estimating β based on available revenue data is provided in the section on tax cascading entitled "concept and measurement."

⁴¹In reality, some cascading would be present if the VAT credit chain associated with any taxed item is broken at any stage along its production-distribution chain. See section on credit vs. subtraction method for a discussion.

Table III.4. Simulated Impact of Replacing a GST with a VAT on the CPI
(In percent)

Simulated CPI Effect of GST at 11 Percent							
Taxed items (48% of CPI)				Tax-exempt items (52% of CPI)			
Degree of cascading(1)	Cascaded tax rate (2)=(1)x11%	Final-stage tax rate (3)	Compounded effect on CPI from tax (4)=[1+(2)x(1+(3))]-1	Cascaded tax rate (5)=(2)	Final-stage tax rate (6)	Compounded effect on CPI from tax (7)=(5)	Weighted average of tax effects on overall CPI (8)=(4)x48%+(7)x52%
100	11.0	11.0	23.2	11.0	0.0	11.0	16.9
75	8.3	11.0	20.2	8.3	0.0	8.3	14.0
50	5.5	11.0	17.1	5.5	0.0	5.5	11.1
25	2.8	11.0	14.1	2.8	0.0	2.8	8.2

Simulated CPI Effect of VAT at 13 Percent							
Taxed items (69% of CPI)			Tax-exempt items (31% of CPI)				
Cascaded tax rate (9)	Final-stage tax rate (10)	Compounded effect on CPI from tax (11)=(10)	Cascaded tax rate (12)=(1)x13%	Final-stage tax rate (13)	Compounded effect on CPI from tax (14)=(12)	Weighted average of tax effects on overall CPI (15)=(11)x69%+(14)x31%	Overall impact on CPI of replacing GST by VAT (16)=(15)-(8)
0.0	13.0	13.0	13.0	0.0	13.0	13.0	-3.9
0.0	13.0	13.0	9.8	0.0	9.8	12.0	-2.0
0.0	13.0	13.0	6.5	0.0	6.5	11.0	-0.1
0.0	13.0	13.0	3.3	0.0	3.3	10.0	1.8

Source: Staff calculations.

The Credit Versus Subtraction Method

- *What are the mechanics of computation under the credit method and what economic implications does it entail?*
- *What are the mechanics of computation under the subtraction method and what economic implications does it entail?*
- *What are the comparative merits and limitations of the two methods?*

This section compares, by means of a simple numerical example, the merits and shortcomings of two alternative methods of computing the value added of a taxable transaction under a VAT: the credit (also known as the invoice) method and the subtraction method.⁴² The two methods give rise to different economic consequences whenever a VAT contains multiple rates, zero-ratings, and exemptions. The numerical example assumes a three-stage production-distribution process in which a manufacturer sells to a wholesaler who in turn

sells to a retailer. The value added at each stage is assumed to be 100 and the VAT rate is assumed to be 10 percent on a tax-exclusive basis (or 9.1 percent on a tax-inclusive basis) at all stages. Implications from using the two methods when the VAT has multiple rates are also noted.

The Credit Method

The various aspects of the credit method are illustrated in the four panels of Table III.5.

The mechanics of computation

The credit method requires that the amount of VAT charged be explicitly stated on the invoice associated with any taxable transaction. The amount of tax a merchant submits to tax authorities is simply the difference between the tax he collected on his sales and the tax he paid on his purchases. Panel A of Table III.5 shows how a VAT of 10 is collected at each of the three stages using this method. The total VAT collected is thus 30—precisely 10 percent of the total value added of 300. Note that it is the consumer who bears the ultimate burden of the VAT, since the retailer's sales cum VAT is 330; the merchant at each stage only acts as a collection agent.

⁴²A third method, known as the addition method, defines value added on the basis of the sum of factor payments (including profits). This method, which makes a VAT resemble an income tax, is rarely used.

Table III.5. The Credit Method

	Manufacturer	Wholesaler	Retailer	Total VAT	Sales cum VAT to the Final Consumer ¹
A. All businesses subject to tax					
(1) Sales (excluding VAT)	100	200	300		
(2) Purchases (excluding VAT)	0	100	200		
(3) VAT on sales [10 percent of (1)]	10	20	30		
(4) Credit on purchases [(10 percent of (2))]	0	10	20		
(5) Net VAT payments [(3)-(4)]	10	10	10	30	330
B. Retailer is zero-rated					
(1) Sales (excluding VAT)	100	200	300		
(2) Purchases (excluding VAT)	0	100	200		
(3) VAT on sales [10 percent of (1)] ²	10	20	0		
(4) Credit on purchases [10 percent of (2)]	0	10	20		
(5) Net VAT payments [(3)-(4)]	10	10	-20	0	300
C. Retailer is exempt					
(1) Sales (excluding VAT)	100	200	320		
(2) Purchases (excluding VAT)	0	100	200		
(3) VAT on sales [10 percent of (1)]	10	20	na		
(4) Credit on purchases [10 percent of (2)]	0	10	na		
(5) Net VAT payments [(3)-(4)]	10	10	na	20	320
D. Wholesaler is exempt					
(1) Sales (excluding VAT)	100	210	310		
(2) Purchases (excluding VAT)	0	100	210		
(3) VAT on sales [10 percent of (1)]	10	na	31		
(4) Credit on purchases [10 percent of (2)]	0	na	na		
(5) Net VAT payments [(3)-(4)]	10	na	31	41	341

Source: Staff calculations.

Note: na means not applicable.

¹Sales cum VAT to the final consumer is the sum of (1) and (3) in each panel under the retailer's column.

²For the retailer, 0 percent of (1).

Zero-rating the retailer

Under a VAT system, a zero-rated merchant charges no VAT on his sales but can claim a refund on the VAT he paid on his purchases. Panel B of Table III.5 illustrates the case of a zero-rated retailer, who is able to claim a refund of 20. This refund turns out to be exactly equal to the sum of the VAT collected from the manufacturer and the wholesaler; the total VAT collected is thus zero. As no VAT is charged on the retailer's sales of 300, there is no tax burden borne by the consumer.

There are two important implications from the above result. First, zero-rating a merchant effectively removes the tax elements in all the sales of taxed merchants situated before the zero-rated merchant along the production-distribution chain. In the above example, the tax elements in the sales of the manufacturer and wholesaler—merchants situated before the retailer—are removed when the retailer is zero-rated. Second, a VAT implemented with the credit method effectively taxes a product at the rate that is applied at the final stage of the product's sale, even if different rates were applied at earlier stages. Again referring to the numerical example above, the illustrated sales bear

no tax because the retailer—the seller at the final stage—happens to apply (by assumption) a tax rate of zero. Alternatively, had the retailer been subject to a VAT rate of, say, 5 percent (while the rate of 10 percent continues to apply to the manufacturer and wholesaler), his refund would have been 15, and the total VAT collected would have been 5; the retailer's sales cum VAT in this case would have been 305.

Exempting the retailer

Like a zero-rated merchant, an exempted merchant does not charge a VAT on his sales; unlike a zero-rated merchant, however, the exempted merchant is out of the VAT net and therefore cannot claim a refund on the VAT he paid on his purchases. Panel C of Table III.5 illustrates the case of an exempted retailer, who pays a VAT of 20 on his purchases but obtains no refund. The total VAT collected in this case is 20—10 from the manufacturer and 10 from the wholesaler. Compared with the case where all businesses are taxed (Panel A of Table III.5), exempting the retailer lowers the VAT collection—and therefore the tax element in the sales to the consumer—by 10, which is precisely equal to 10 percent of the retailer's value added.

Breaking the credit chain

In contrast to exempting a merchant situated at the final stage of the production-distribution chain, which, as illustrated in Panel C of Table III.5, has the effect of removing his value added from the VAT base, exempting a merchant at any stage prior to the final stage has a drastically different effect under a VAT using the credit method. Panel D of Table III.5 illustrates the case where the wholesaler—instead of the retailer—is exempt from tax.

The wholesaler, being exempted from the VAT, cannot claim a tax credit of 10 for the VAT he paid on his purchases from the manufacturer. In response, he compensates by charging a correspondingly higher price on his sales—210 now as opposed to 200 in the case where he is taxed (Panel A of Table III.5). Moreover, since the wholesaler does not charge a VAT on his sales to the retailer, the latter also has no tax credit to claim. Hence, the retailer simply collects a VAT of 31 from the consumer, which is 10 percent of his sales of 310 (210 plus his value added of 100). The total VAT collected is now 41—31 from the retailer and 10 from the manufacturer. Compared with Panel A of Table III.5, exempting the wholesaler thus causes the VAT revenue to increase by 11, or the VAT base to increase by 110. This happens because, by breaking the credit chain, the exemption not only allows the value added of the exempted merchant to be recovered at a later stage (the retail stage in the example) where it is taxed, but it also causes the value added of the merchant at the earlier stage (the manufacturing stage in the example) to be taxed again at a later stage. The resulting double taxation of the value added of all merchants situated before the exempted merchant along the production-distribution chain is exactly the same as a cascading turnover tax would have caused. In the example, the value added of the manufacturer is taxed twice, thus accounting for 10 of the additional VAT collected. The remaining 1 is simply the result of the tax on tax.

The Subtraction Method

The various aspects of the subtraction method are illustrated in the four panels of Table III.6, which uses the same numerical example as in Table III.5.

The mechanics of computation

Under the subtraction method, each merchant's tax liability is computed by applying the applicable VAT rate to the difference between his total sales (inclusive of the VAT element in his sales price) and his total purchases (inclusive of the VAT element in his purchase

price). Hence, unlike the credit method, the amount of VAT connected with a taxable transaction is not required to be explicitly stated on the associated invoice. Panel A of Table III.6 shows how a VAT with the same rate structure as the one considered earlier under the credit method is collected under the subtraction method.

The first row in each panel of Table III.6, labeled "sales (excluding VAT)," refers to the amount of sales at each stage along the production-distribution chain excluding the VAT charged at *that* stage, but it includes any VAT charged at earlier stages. For example, for the wholesaler in Panel A of Table III.6, his sales excluding VAT (210) can be determined by adding his value added (100) to his purchases from the manufacturer (110), the latter being an amount inclusive of the VAT charged by the manufacturer. The wholesaler's sales including the VAT (220) are obtained simply by adding the VAT on his value added (10 percent of 100, or 10) to his sales excluding the VAT (210).

The above steps serve only the purpose of illustrating the mechanics of how a merchant would arrive at the proper pricing decision inclusive of the VAT. For purposes of computing the merchant's VAT liability, only the difference between his sales and his purchases (both on a gross-of-tax basis) matters. For the wholesaler in the example, his VAT base (110) is calculated by subtracting his purchases (110) from his sales (220), both inclusive of all VAT elements. His VAT liability is then determined by applying the VAT rate of 9.1 percent (which is equivalent to 10 percent on a tax-exclusive basis) to his base of 110, resulting in a VAT payment of 10.

As illustrated in Panel A of Table III.6, where all businesses are subject to tax, the subtraction method yields the same outcome as the credit method: a VAT of 10 is collected at each stage along the production-distribution chain, but it is the consumer who bears the entire tax burden.

Zero-rating the retailer

Just like the credit method, all tax elements are removed under the subtraction method if the merchant at the end of the production-distribution chain is zero-rated. As illustrated in Panel B of Table III.6, zero-rating the retailer effectively sets his sales to zero for purposes of calculating his tax base, thus resulting in a negative base of 220 and a tax refund of 20, which is exactly equal to the total VAT element on his purchases. Since this refund is anticipated, the retailer's sales to the final consumer will (or should) not contain any VAT element at all.

Table III.6. The Subtraction Method

	Manufacturer	Wholesaler	Retailer	Total VAT	Sales cum VAT to the Final Consumer ¹
A. All businesses subject to tax					
(1) Sales (excluding VAT)	100	210	320		
(2) Purchases (including VAT)	0	110	220		
(3) Sales (including VAT)					
[110 percent of ((1)-(2))+(2)]	110	220	330		
(4) VAT base [(3)-(2)]	110	110	110		
(5) Net VAT payments [9.1 percent of (4)]	10	10	10	30	330
B. Retailer is zero-rated					
(1) Sales (excluding VAT)	100	210	300		
(2) Purchases (including VAT)	0	110	220		
(3) Sales (including VAT)					
[110 percent of ((1)-(2))+(2)] ²	110	220	300		
(4) VAT base [(3)-(2)] ³	110	110	-220		
(5) Net VAT payments [9.1 percent of (4)]	10	10	-20	0	300
C. Retailer is exempt					
(1) Sales (excluding VAT)	100	210	320		
(2) Purchases (including VAT)	0	110	220		
(3) Sales (including VAT)					
[110 percent of ((1)-(2))+(2)] ²	110	220	320		
(4) VAT base [(3)-(2)]	110	110	na		
(5) Net VAT payments [9.1 percent of (4)]	10	10	0	20	320
D. Wholesaler is exempt					
(1) Sales (excluding VAT)	100	210	310		
(2) Purchases (including VAT)	0	110	210		
(3) Sales (including VAT)					
[110 percent of ((1)-(2))+(2)] ⁴	110	210	320		
(4) VAT base [(3)-(2)]	110	na	110		
(5) Net VAT payments [9.1 percent of (4)]	10	0	10	20	320
E. Both wholesaler and retailer zero-rated					
(1) Sales (excluding VAT)	100	200	282		
(2) Purchases (including VAT)	0	110	200		
(3) Sales (including VAT)					
[110 percent of ((1)-(2))+(2)] ⁵	110	200	282		
(4) VAT base [(3)-(2)] ⁶	110	-110	-200		
(5) Net VAT payments [9.1 percent of (4)]	10	-10	-18	-18	282

Source: Staff calculations.

Note: na means not applicable.

¹Sales cum VAT to the final consumer is (3) in each panel under the retailer's column.

²For the retailer (1).

³For the retailer, his sales are set to zero in his VAT base calculation.

⁴For the wholesaler (1).

⁵For both the wholesaler and retailer (1).

⁶For both the wholesaler and retailer, their sales are set to zero in their VAT base calculations.

Exempting the retailer

When the retailer is out of the VAT system, he does not have to compute his VAT base (since he cannot claim any refund) and does not charge any VAT on his sales to the consumer (Panel C, Table III.6). His sales (320) are simply the sum of his purchases inclusive of the VAT (220) and his value added (100). The total tax burden on the consumer is now 20—10 less than the case when all businesses are taxed (Panel A, Table III.6). This reduction in VAT collection corresponds exactly to the shrinkage of the VAT base as a result of the removal of the retailer's value added. As

can be seen from Panel C, Table III.6, the subtraction method also yields the same result as the credit method in this case.

Exempting the wholesaler

In stark contrast to the credit method, under which breaking the credit chain by exempting the wholesaler gives rise to cascading, no cascading results from exempting the wholesaler under the subtraction method (Panel D, Table III.6). This is so because the subtraction method computes the VAT base at each stage as the difference between the sales and purchases at that

stage, and therefore, no value added of earlier stages can ever cascade forward and be taxed again. In Panel D, Table III.6, the wholesaler, being tax exempt, charges no VAT on his sales (210)—the sum of his purchases (110) and his value added (100)—to the retailer. Since the entire amount of the retailer's purchases is deducted from the retailer's own sales in determining his VAT base, that base cannot include the value added of the manufacturer and the wholesaler. Hence, exempting a merchant from tax under the subtraction method always removes the exempted merchant's value added from the tax base, regardless of where he is situated along the production-distribution chain (compare Panels B and C, Table III.6). Unlike the credit method, this loss of the tax base is never recovered down the chain, nor will any value added up the chain be taxed again down the chain.

Zero-rating both the wholesaler and the retailer

Under the credit method, the zero-rating of a merchant does not constitute a break in the credit chain, and therefore cannot cause any unintended effects, regardless of where and how often it occurs along the production-distribution chain. In contrast, under the subtraction method, if the zero-rating occurs at two or more stages, the result is that the VAT base will be reduced by *more* than what the zero-rating is intended to achieve. Panel E of Table III.6 illustrates the case where both the wholesaler and the retailer are zero-rated. The zero-rating of the wholesaler produces the desired effect: he gets a VAT refund of 10 to compensate for the VAT he paid on his purchases from the manufacturer. Moreover, he does not charge any VAT on his sales to the retailer. The retailer, however, being zero-rated also, likewise obtains a refund (18, or 9.1 percent on his purchases of 200 from the wholesaler). In the example, the benefit of the retailer's refund is assumed to be passed on to the consumer. Thus, instead of being charged for a total of 300 on his purchases (the intended amount of the zero-rating), the consumer ends up paying only 282. The VAT has become a value-added subsidy.

This peculiar outcome underscores a shortcoming of the subtraction method, which contains a built-in assumption that a VAT has been paid on all purchases made by a merchant as long as he is in the VAT system (as opposed to one who is tax-exempt), even if the VAT element had already been removed because of the zero-rating(s) somewhere earlier along the production-distribution chain. By similar reasoning, the subtraction method can be seen to be unsuitable for any VAT system that has multiple rates, for it will assume that the purchases of any merchant have been all taxed at the same

rate that applies to the merchant in question, even if such purchases had been taxed at different rates earlier.⁴³

Summary of Comparison

If a VAT has a single rate and has no exemptions and zero-ratings, the credit and subtraction methods will produce identical outcomes, and the choice between the two must be made on grounds other than tax policy.⁴⁴ When the VAT contains multiple rates and extensive exemptions, however, neither method is capable of completely overcoming the undesirable effects of these imperfections in the VAT system itself, and the choice between the two comes down to a comparative trade-off of costs and benefits in each.

With the credit method, the important implication is that exempting any merchant situated anywhere before the final stage along the production-distribution chain breaks the credit chain and results in cascading, which reduces one of the fundamental benefits of having a VAT in the first place. With the subtraction method, no such cascading can result. It is, however, incapable of handling multiple rates. Since a perfect VAT system does (and will) not exist in practice, the preferred method clearly depends on the nature and severity of the imperfections. For example, on the one hand, the use of the subtraction method is ruled out in a VAT with multiple rates.⁴⁵ On the other hand, for a single-rate VAT with extensive exemptions, the subtraction method should clearly be preferred.

Estimating the VAT Base

- *What is the base of a VAT, and how can it be estimated, using a step-by-step illustration, from various data sources?*

The applicable base of a VAT depends on a number of aspects related to its design, for example, whether it is origin- or destination-based, of the income- or con-

⁴³For a VAT system that has only a zero rate in addition to one positive rate, the subtraction method can still be used, but it requires that all merchants must separate their purchases which are not taxed from those which are taxed. This requirement in effect turns the subtraction method into the credit method in substance.

⁴⁴For example, the credit method leaves behind an "audit trail," in the sense that the invoice of any taxable transaction can easily be used to check the tax paid by the buyer against the tax collected by the seller. Hence, the credit method could be preferred on this administrative ground.

⁴⁵This is probably the most important reason for the prevalence of the credit method in the VAT systems around the world. This limitation of the subtraction method, however, could be exploited to the advantage of a country's tax design, such as that in Japan, by ensuring that its adoption would necessarily entail a single-rate VAT.

Table III.7. A Framework for Estimating the Base of a VAT¹

	Remarks	Likely Data Source ²
<i>Starting point of estimation:</i> GDP (market prices)	Sum of value added of domestic production	NIA
<i>Adjustment A: trade balance</i>	For destination-based VAT	
1. Minus exports		NIA
2. Plus imports		NIA
<i>Adjustment B: capital formation</i>	For consumption-type VAT	
1. Minus gross domestic capital formation		NIA
2. Add residential buildings		NIA
3. Add capital formation in exempt sectors		NIA
<i>Adjustment C: exempt sectors</i>		
1. Minus value added of exempt sectors (factor costs)	E.g., nonexportable agriculture, financial services, owner-occupied dwellings, wholesale and retail	NIA
2. Minus indirect taxes in exempt sectors	Convert adjustment from factor costs to market prices	NIA, GOT
<i>Adjustment D: cascading</i>	Caused by credit-invoice method	
1. Add purchases of output from exempt sectors by taxed sectors		I/O
2. Add taxed inputs in exportable agriculture		I/O, GOT
<i>Adjustment E: government expenditure</i> Minus expenditure on wages and salaries	Nontaxable expenditure component in NIA	NIA, GOT
<i>Adjustment F: final private expenditure</i>		
1. Minus exempt expenditures	E.g., rents, education, and health services	NIA, CPI
2. Add taxed inputs in exempt expenditures	Due to cascading	I/O
3. Add foreign expenditures in local markets		NIA
4. Minus expenditures abroad by residents		NIA
<i>Adjustment G: exemption threshold</i>	For reducing administrative costs	
1. Minus sales of firms below threshold		GOT
2. Add taxed inputs in above sales	Due to cascading	GOT
<i>Adjustment H: tax replacement</i> Minus sales taxes to be replaced by the VAT		GOT
<i>Adjustment I: collection leakage</i> Minus estimated extent of leakage		GOT

¹The estimation framework assumes a destination-based, consumption-type VAT implemented with a credit-invoice method.

²NIA = national income accounts; I/O = input/output tables; CPI = consumer price index basket; and GOT = various government and tax departments.

sumption-type, implemented with a credit-invoice or subtraction method, and contains many or few exemptions.⁴⁶ This section develops a general framework for estimating the base of the most widely adopted form of the VAT—a destination-based, consumption-type system implemented with a credit-invoice method. Table III.7 describes the framework with a step-by-step illustration of the various computations involved in the estimation process. Remarks about the computations and the likely sources where required data can be found at each step are also provided.⁴⁷

⁴⁶For a discussion of the concepts of origin- vs. destination-based, as well as income- vs. consumption-type VAT systems, see the section on selected issues in designing a VAT. For a discussion of the differences between the credit-invoice and the subtraction methods, see the section on credit vs. subtraction method.

⁴⁷Various issues related to estimating the VAT base are discussed in, among others, Aguirre and Shome (1988), Cnossen (1992), and Mackenzie (1992).

GDP as Starting Point of Estimation

A logical starting point for estimating the VAT base is the gross domestic product (GDP) of an economy, since it represents the sum total of the value added in the domestic production of goods and services. From this, various adjustments can then be made to account for the different features that have been incorporated into the VAT's design. For a destination-based, consumption-type VAT, however, a legitimate question can be raised as to whether final consumption expenditure, which represents the sum total of value added of domestic consumption, is not a more direct starting point in estimating the VAT base. The answer, as it turns out, depends to a large extent on the scope and nature of exemptions of the VAT under consideration.

To see the issue related to the choice of the starting point of estimation more clearly, consider the following familiar national income accounting identity at the most aggregative level:

$$\text{GDP} = C + I + G_c + G_w + (X - M), \quad (38)$$

where C is final private consumption expenditure, I is investment expenditure, G_c is final government expenditure on goods and services (net of wages and salaries), G_w is government expenditure on wages and salaries, and X and M are, respectively, the values of exported and imported goods and nonfactor services (the term $(X - M)$ represents, therefore, the trade balance). Since a destination-based, consumption-type VAT is basically a tax on final consumption expenditure on goods and services within the domestic economy, its base must correspond to the sum of final private consumption expenditure C and government expenditure on goods and services (net of wages and salaries) G_c . But a rearrangement of equation (38) yields

$$C + G_c = \text{GDP} - (X - M) - I - G_w, \quad (39)$$

which indicates that to use GDP as the starting point in estimating the VAT base indeed entails a roundabout way of arriving at the sum of C and G_c , as data on the latter consumption categories are usually directly available in national income accounts.

There is, however, a technical difficulty in bypassing data on the production side of the economy: it is seldom feasible to implement a VAT without exemptions, and if such exemptions do not have a one-to-one correspondence with final consumption items (as in sector-specific exemptions, such as those granted to the wholesale and retail sectors), adjustments to the base estimation would then have to be made using sectoral value-added data, that is, data from which GDP from the production side is computed in the first place. Furthermore, in many developing countries, consumption data are often less reliably compiled than data on production. Indeed, it is not uncommon to find that the former are simply derived on the basis of the accounting relationship depicted in equation (39). Hence, under most circumstances, there is no avoiding the use of GDP data on the production side in estimating the VAT base.

Adjustments to GDP

This section describes the necessary adjustments to the GDP figure—the starting point of estimation—to arrive at the base of a destination-based, consumption-type VAT implemented with a credit-invoice method. The order of the adjustments follows that given on the right-hand side of equation (39).

Adjustment A: trade balance

Since a destination-based VAT taxes consumption at the point where consumption occurs, it covers imports

but excludes exports.⁴⁸ Hence, the trade balance, that is, exports less imports ($X - M$), is a reduction of the VAT base and must, therefore, be subtracted from GDP.

Adjustment B: capital formation

For the consumption-type VAT, gross capital formation, representing the sum total of purchases of capital goods (i.e., investment expenditure I) in the economy, is not taxed⁴⁹ and should, therefore, be removed from the VAT base. That part of capital formation which consists of new residential buildings, however, will be in the base (since consumers cannot claim tax credits); it should, therefore, be added back. Capital goods purchased by exempt sectors (see below) are also an addition to the base, as tax credits would not be available to these sectors.

Adjustment C: exempt sectors

The VAT base is reduced by the sum of the value added of exempt sectors. Certain sectors of an economy, such as the financial and insurance sector and the sector representing the imputed value of owner-occupied dwellings, are either difficult or infeasible to tax and are almost always exempted in a VAT system. In many developing countries, it is often considered administratively infeasible to subject the wholesale and retail sectors to the VAT, in which case the value added of these sectors must also be removed from the VAT base.

The treatment of the agricultural sector under a VAT is also problematic. In most developing countries, for equity as well as administrative reasons, farmers are generally exempted from indirect taxation. It is, therefore, realistic to assume that this sector would be exempt also under the VAT.⁵⁰ In deducting the value added of the agricultural sector, however, a distinction must be made between the value added of exportable and that of nonexportable agricultural output. The loss related to the former has already been accounted for in the treatment of exports. Thus, only the loss of the latter needs to be subtracted in arriving at the VAT base.⁵¹

Since sectoral value-added data in national income accounts are usually given on the basis of factor costs,

⁴⁸Formally, it zero-rates exports. See the section on credit vs. subtraction method for a discussion of the zero-rating concept in a VAT.

⁴⁹More formally, is first taxed but receives a full tax refund afterwards in the form of tax credits under the credit-invoice method.

⁵⁰In many EC countries, for example, farmers are exempted from the VAT, but are provided various forms of compensation to alleviate their burden arising from their taxed inputs. Some countries, however, such as New Zealand, Sweden, and the United Kingdom, treat farmers just like other taxed producers. It must be noted that, even if the agricultural sector is taxed, small farmers could be exempted by the exemption threshold (see below).

⁵¹If a portion of the exportable agricultural output is consumed domestically in an unprocessed form, it should also be subtracted.

indirect taxes in the exempt sectors must also be deducted to convert the adjustment to a market-price basis.

Adjustment D: cascading

Whenever an exempted business sells its products to any taxed business under a VAT using the credit-invoice method, cascading would result in much the same way a turnover tax does, and consequently would cause the VAT base to be higher than that had the exemption not been granted.⁵² Hence, the sum of the total value (not simply the value added) of that part of the output of the exempt sectors that is sold to taxed sectors as inputs must be added to the VAT base. An interesting implication of this adjustment is that it is theoretically possible (although unlikely in practice) to end up with a larger VAT base when exempt sectors are present than that when they are not.⁵³ This result, however, cannot be interpreted as an indication that exemptions are therefore desirable, since the increase in the tax base is entirely due to cascading—the elimination of which is usually one of the primary reasons for considering the introduction of a VAT.

Another necessary adjustment related to cascading involves taxed agricultural inputs. If farmers are exempt, they cannot claim credits for the VAT they paid on their purchases. This tax element cannot be removed even with the zero-rating of exports (except for farmers who are direct exporters). Hence, the value of the taxed inputs used in the production of exportable agricultural output is an addition to the VAT base. This adjustment does not apply, however, to those inputs used in the production of nonexportable agricultural output, since the preceding adjustment—the adding back of the output of exempt sectors sold to taxed sectors—has already accounted for them.

Adjustment E: government expenditure

While all government purchases of goods and services should be taxed, that portion of its expenditure which represents wages and salaries (G_w) is not taxable, and hence must be deducted from the VAT base.

Adjustment F: final private expenditure

The completion of Adjustments A through E above yields the sum of final private and (nonwage) govern-

ment consumption expenditures, that is, $C + G_c$. From this, exempted final private consumption expenditures must be subtracted from the base, such as those on rents, and education and health services. Since, for reasons identical to those discussed in Adjustment D above relating to cascading, these expenditures would contain tax elements as long as inputs used in their production are taxed at earlier stages anywhere along the production-distribution chain, the value of such inputs should, therefore, be added to the VAT base. Finally, an adjustment must be made for consumption by foreigners in local markets (an increase to the base) and purchases by domestic residents abroad (a decrease to the base).

Adjustment G: exemption threshold

Small businesses are usually large in number but collectively yield little revenue for the tax system. A VAT that includes all such businesses would, therefore, unduly impair its administrative efficiency. Methods that have been used by countries around the world to deal with the small business problem are varied. By far the simplest and most frequent one involves setting a turnover threshold below which businesses are exempt.⁵⁴ The total sales of the businesses below the threshold are, therefore, not part of the VAT base and should be deducted from it. Taxed inputs used in these sales, however, must be added back owing to the cascading discussed above.

Adjustment H: tax replacement

The estimate of the VAT base arrived at after completion of Adjustment G would be on the basis of market prices, that is, inclusive of all existing indirect taxes in the base. If, as is frequently the case, the VAT under consideration is intended to replace one or more such taxes, then the total revenue from the taxes to be replaced must be subtracted from the above base estimate.

Adjustment I: collection leakage

This adjustment is necessitated by the recognition that the VAT base, computed according to the above procedure, is a potential figure, which may not be the same as the recoverable VAT base. The gap between the two could be due to a number of possible collection leakages, most notably that of taxpayer noncompliance. The extent of these leakages must, however, be judged on a country-by-country basis.

⁵² This consequence would not arise if the VAT is implemented under the subtraction method. See the section on credit vs. subtraction method for a numerical demonstration.

⁵³ This is demonstrated in the section on credit vs. subtraction method.

⁵⁴ The proper choice of the threshold, which involves the optimal balancing of increased administrative costs against additional revenue losses, requires information concerning the frequency distribution of businesses by sales brackets.

Excise Taxes

WILLIAM J. MCCARTEN AND JANET STOTSKY

- *What is the role of excise taxes in a tax system?*
- *What goods do excise taxes typically apply to and why?*
- *What are the major design issues in an excise tax?*
- *How do excises correct for negative externalities?*

Excise taxes are taxes imposed on the consumption of selected goods, such as alcoholic beverages, tobacco products, and petroleum products.⁵⁵ Goods selected for excise coverage typically exhibit one or more of the following characteristics: first, their production and sales are closely supervised by the government, that is, they are sumptuary goods or services; second, they are characterized by price-inelastic demand schedules; third, they have an income elasticity of demand greater than unity, that is, they are luxury goods or services; or fourth, their consumption is regarded by the government as lacking merit or as likely to cause negative externalities. Excise tax rates may be defined in either specific or ad valorem terms and they are usually much higher than the rates applied under the general sales tax or VAT. Because of their relatively narrow focus, excise taxes can have a powerful impact on consumer decision making and resource allocation and are therefore potentially very effective instruments for the attainment of policy goals beyond revenue generation.

The Rationale for Excise Taxation

Revenue generation

Why should a selected set of commodities and services be subject to taxation in excess of a general sales tax or VAT? The most compelling reason for the use of excise taxes is that they can potentially raise a great deal of revenue with little distorting effect, generating little excess burden. They also require relatively little

administrative effort and provide limited opportunities for tax evasion. Large sales volumes, few producers, inelastic demand, easy definability, and a lack of close substitutes favor the use of excises where revenue generation is the goal. If excises are applied only to goods and services that exhibit inelastic own-price demand within the observed range of price changes, the percentage change in consumption will be smaller than the percentage change in price. If the compensated own-price elasticities for excisable commodities are also low, the excess burdens arising from the imposition of an excise will be less than for equal revenue-yielding taxes imposed on commodities or factors with more elastic demands.⁵⁶ The theory of optimal taxation postulates that when supply is infinitely elastic, the indirect tax structure which generates the smallest loss in efficiency is one where the tax rates for different commodities are set at differential rates so that the tax rate expressed as a proportion of the after-tax price is inversely proportional to the compensated demand elasticity.⁵⁷

The case for relying on excises for a significant proportion of consumption tax revenues is bolstered in many developing countries by the administrative weaknesses and opportunities for evasion which often characterize other consumption taxes, such as the general sales tax, the VAT, and even customs duties.

Correcting for negative externalities

Two commodity groups are perceived as appropriate targets for excise taxation on the basis of the negative externalities associated with their use. These groups are sumptuary or regulated goods, such as tobacco and alcohol products, and inputs into motor vehicle use, including both fuel and the vehicles themselves. Excises on such commodities are intended to internalize negative externalities generated by the consumer. High sumptuary taxes are often justified in terms of the social and medical costs of alcoholism and the medical hazards of tobacco use. Even if medical treatment for those with lung cancer is nonexistent or borne entirely by patients, cancer caused by secondary smoke is clearly a negative externality. High rates of

⁵⁵In developing countries, levies on tobacco products, alcoholic beverages, and petroleum production may typically account for over two thirds of excise tax receipts. When fuel taxes, motor vehicle taxes, tire taxes, and other road use charges are considered in total, motor vehicle use emerges as the most important source of revenue, while tobacco products and alcoholic beverages vie for second place. Other commonly found excises are soft drinks, textiles, cement, sugar, and gambling.

⁵⁶The conclusion follows from the well-known result that the excess burden of a tax is a positive function of the compensated elasticity of demand.

⁵⁷See the section on the theory of optimal commodity taxation.

taxation on tobacco and alcohol can also be justified on the grounds that consumers, particularly the young, may not be fully aware of the long-run health consequences of using these products.

High excises may not be effective deterrents to consumption for addictive substances. For instance, studies on alcohol and tobacco use have found price inelastic demand for these products. There are, however, two important caveats to these results. First, most of the evidence has been assembled in low-tax jurisdictions and most of the studies have adopted empirical specifications which constrain elasticities to be constant over the entire range of demand. Second, recent studies on cigarette demand by teenagers in industrial countries have found price elasticities in excess of one.⁵⁸ These findings suggest that high excises may be effective in deterring teenagers from smoking, in contrast to their impact on adults, who may have already acquired an addiction to tobacco. If high tax rates on tobacco are sustained over a long period, the higher prices may depress the demand of successive cohorts of teenagers and have a lasting impact on aggregate consumption. These findings are also likely to be valid in developing countries.

High excise taxes on motor vehicle use, both fuel and vehicles, are also justified on the grounds of negative externalities associated with their use. Motor vehicles generate negative externalities through air, water, and noise pollution, as well as generating congestion. Some jurisdictions have applied the benefit principle to the use of revenue arising from excises related to road use, by earmarking this revenue for road repair and construction. The argument against earmarking these revenues is that it limits governmental discretion in the use of public sector resources. Nevertheless, earmarking, particularly for road-related excises, has been defended on the grounds that it may raise social welfare by revealing social preferences for public goods more effectively. Second, earmarking may enhance public support for higher taxation to finance incremental expenditure programs, which the public might not otherwise support in the absence of linkage.⁵⁹ Legislation mandating such earmarking should contain a sunset clause requiring review of the program after a fixed period of implementation. Earmarking of narrowly based expenditure programs in the absence of externalities is generally undesirable.

Excises as a tool for improving vertical equity

It is generally not advisable to expand the scope of excise taxes beyond sumptuary goods, fuel, and a few luxuries. Some jurisdictions attempt to use excises as an instrument to enhance vertical equity. The desire to pursue such a strategy is understandable if direct taxation is not progressive owing to weak tax administration.⁶⁰ Employing indirect taxes as instruments to achieve greater progressivity may lead to a proliferation of excises on a great variety of "luxury" commodities, resulting in large administrative costs and arbitrary decisions.

The case for the use of a *system of excise taxes* to achieve greater progressivity in indirect taxation has also been argued.⁶¹ There are five conditions under which this may hold. First, the cross-section income elasticity of demand for goods and services to be taxed should exceed unity and the own-price elasticity of demand should be low, so that reduction of the share of taxed commodities in household expenditure patterns following imposition will be small. Second, expenditures on excisable commodities should be a large fraction of the household income of middle- and upper-income families and such expenditures should account for a much smaller fraction of the incomes of lower-income households. Third, if excise taxation must be extended to cover commodities purchased by lower-income households, then the excise tax system should use differentiated rates applied to subgroups of commodities on the basis of quality or price. Fourth, an excise system of progressive design must be administratively feasible so that disputes and arbitrary assessments can be minimized and the system enforced as the lawmakers intend. And fifth, the system should be perceived by the public as progressive.

It may be difficult to apply these requirements in a rigorous manner in developing countries. Income elasticities of demand for the relevant commodities and up-to-date data on expenditure patterns broken down by income classes are often not available. In the absence of such estimates, generalizations about what is and is not a luxury good are apt to be based on conjecture or the arbitrary application of research findings from other jurisdictions. Differentiating excise rates within commodity groups by price and quality, with higher rates of tax applied to the higher grade and more expensive grades in the expectation that the rich will favor these, will greatly complicate administration. The designers of such "fine-tuned" measures should be aware of the technological possibilities for substitut-

⁵⁸See Grossman, Sindelar, Mullahy, and Anderson (1983).

⁵⁹See Bird (1992).

⁶⁰See Shome (1993).

⁶¹See Cnossen (1991).

ability. For example, kerosene, which might be tax preferred as a nonluxury good, can be mixed with diesel fuel to produce an effective motor fuel. If this practice is widespread, it may be difficult to target goods primarily used by the poor for low excise tax rates. The case for excises on luxury goods is weaker than that for sumptuary and road-use related commodities because the own price elasticities are likely to be much higher, leading to much greater distortions in consumption decisions. Consumers are deprived of satisfaction while the government gains little revenue.

Empirical evidence suggests that excises on tobacco products and beer are regressive. The empirical results for liquor are mixed, with selected empirical studies using Jamaican data finding income elasticities in excess of one.⁶² Sugar taxes are typically highly regressive and for this reason should be avoided.⁶³ A recent study found that taxes on kerosene are regressive in Indonesia, Thailand, and Tunisia, while excises on gasoline are progressive and contribute to economic efficiency.⁶⁴

Trade-offs among goals in the use of excise taxes

It has been argued that high rates of taxation should not be applied in developing countries on those sumptuary goods with low income elasticities of demand because the resulting tax burden is highly regressive and because the low exhibited price elasticities defeat the putative intent of deterring consumption.⁶⁵ In rebuttal, it may be noted that poverty per se should not necessarily entitle one to create negative externalities. Moreover, as noted above, with higher tax rates, demand might be more price elastic and these elasticities may be higher for groups that have not yet formed strong or addictive habits.

Taken to the extreme, if the tax on a particular commodity is set high enough, the revenue yield of the tax declines because sales of the commodity decline. At some intermediate rate between this rate and a zero rate, there is a revenue-maximizing tax rate.⁶⁶

At a rate below the revenue-maximizing tax rate for sumptuary goods, increasing the rate both enhances revenue and depresses consumption. Once the revenue-maximizing tax rate has been exceeded, a trade-

off between the two goals emerges and policymakers must identify the relative importance they attach to generating additional revenue and reducing consumption.

Design Issues

Scope of excise taxes

In offering advice on excise taxation, the IMF has encouraged limiting excises to five principal groups: alcohol, tobacco, automobiles, petroleum, and automobile spare parts. It has also recommended the removal of vexatious minor excises and regressive excises in favor of the general sales tax. Recent work in the applied theory of optimal taxation suggests that indirect taxes, including excises, should be imposed as close to the final sale as possible because of the potential for excises to have unexpected distributional and efficiency effects when imposed on intermediate goods.⁶⁷

If the excise does not apply equally to both domestic production and imports, a given excise tax rate change will require a corresponding change in the tax rate on imports, to maintain a given degree of protection. In India, for example, changes are made simultaneously in excises and in levies on imports. In Latin America, excises typically apply to both imports and domestically produced commodities.⁶⁸

Specific versus ad valorem rates

Conventional policy generally advocates that all excises be levied on an ad valorem basis rather than on a specific basis, because this protects the base of the tax from inflation. This is particularly important in developing countries because they are more likely to have high rates of inflation. Nevertheless, the real value of revenues may be maintained under a specific-rate excise tax if there are regular adjustments of the rate to reflect inflation.

Specific rates may be better than ad valorem rates if tax administrative capacities are limited so that undervaluation of domestic goods or imports is a common problem. Under a specific-rate excise tax, disputes over valuation do not arise, since the tax is not based on value but on physical units of the commodity. In addition, specific rates are the appropriate form of tax if the tax is intended to be externality correcting, that is, an ounce of alcohol should be taxed the same whether it is contained in high-quality spirits or not. In some

⁶²See Due (1988).

⁶³See Cnossen (1977), Chapter 4.

⁶⁴See Hughes (1987).

⁶⁵See McLure and Thirsk (1978).

⁶⁶The elasticity of excise tax revenue with respect to the tax rate is equal to one plus the own-price elasticity for the excisable commodity times the share of tax in the tax inclusive price.

$\frac{\partial R}{\partial t} = 1 + \eta \frac{t}{P}$ where η is the own-price demand elasticity.

⁶⁷See Ahmad and Stern (1989).

⁶⁸See Due (1993).

cases, therefore, it may be useful to levy the excise tax with a combination of specific and ad valorem rates or to maintain specific rates on some items.

Ease of administration

Excise tax liability is typically incurred as the commodity leaves the factory gate on domestic goods. Rev-

enue officers are typically stationed inside the production facilities, particularly in the case of breweries, distilleries, and cigarette factories, to maintain on-site checks of production and shipments. Revenue authorities may also require that excisable commodities sold to the public contain an excise stamp or banderole to prevent the sales of nontaxed substitutes.

User Charges and Environmental Taxes

User Charges

GERWIN BELL

- *What is the difference between user charges and taxes?*
- *Where are user charges optimally used?*
- *What are the necessary conditions for the application of user charges?*
- *How are user charges to be set?*

With the levy of user charges for certain goods and services, fiscal authorities in effect mimic the behavior of enterprises in price setting for private goods and services. User charges are, therefore, conceptually different from taxes that are typically levied without a specific link to goods and services provided. Examples of user charges include passport and entrance fees and tolls on road use.⁶⁹ While the seemingly more straightforward administration of a price system may favor the adoption of user charges especially in a context of limited institutional capacity, the theoretical and practical case for user charges is subject to certain caveats. In addition, the conceptual distinction between user charges and taxes is frequently much harder to draw in practical applications, resulting in a wide array of fiscal instruments classified as user charges.

User Charges in Principle

User charges are levied on the use of a specific good or service and thereby on the accruing benefits that economic agents receive from such use. In this way, the application of user charges allows the costs of the good or service to be distributed according to the benefits received. User charges, thus, emulate the *benefit principle* in public finance which states that the payment of a tax ought to correspond to the benefits received from tax-financed goods and services.

Advocates of user charges stress that the allocation of government-provided goods and services through the price mechanism may help to achieve superior allocative outcomes owing to two effects: first, user

charges incorporate the *rationing mechanism* of the price system in that the good or service is only provided to consumers who value it at least at its cost (user charge) such that demand will thereby be limited to a level below saturation demand; second, user charges also provide the *information generation* of the price system because the revenue obtained from user charges may be easily compared to the costs of providing goods and services and can help in the decision about the future allocation of resources. In addition, that the beneficiaries are also the payers is sometimes stressed as contributing to *fairness*.

Critics, on the other hand, doubt the general capability of a government to price its goods or services correctly; in the absence of correct prices, the better allocative outcome due to rationing and improved information would not necessarily be forthcoming. Critics also stress that letting all beneficiaries pay the same user charge for a good or service may not be a fair solution in the presence of unequal income distribution—at least if the good for which a charge is being levied is not a luxury good.⁷⁰

On a theoretical level, the overall use of user charges is subject to two questions: first, which goods and services should be subject to user charges? Second, on which goods and services can user charges be levied? Turning to answer the first, normative, question, user charges should be applied in circumstances where they increase economic efficiency. The second, positive, question may be answered by drawing parallels to the private sector where the application of the price system for rationing is commonplace because the users of private goods and services are easily identifiable and may be excluded from the use of the goods and services if they fail to pay the market price. Therefore, to provide the answer to both questions, user charges are efficiently levied on publicly provided goods or services that enhance economic efficiency *and* have the characteristic that their users may be easily identified and excluded from their consumption. There are two well-defined theoretical cases where the use of user charges may support the achievement of a first-best efficient equilibrium.

One justification for the economic efficiency of user charges is based on the core philosophical foundation

⁶⁹See Brownlee (1961), Copeland (1992), and Bant (1993).

⁷⁰See Bird and Miller (1990).

for government participation in the economy, namely on the correction of *externalities*. One form of such corrective action is the provision of public goods that are undersupplied by the private sector because of their positive consumption externalities. Public goods are defined to be goods that are nonrival in consumption and that allow the accommodation of an extra consumer at zero cost. The requirement, however, for well-functioning user charges that nonpaying users ought to be excluded restricts the cost recovery of public goods through user charges to such public goods for which exclusion of users can be easily enforced. This is true, for example, for national parks that can only be entered through specific gates, but this does not hold for educational radio broadcasts.

Another form of such corrective action is necessitated by the existence of negative externalities. The problem there is that the market may not price certain factors that are used as inputs into production or consumption or both. Economic agents who base their optimization on market prices will thus demand too much of these factors. Examples include the use of air to pollute as well as the recreational use of parklands. Proponents of user charges point out that the government can increase economic efficiency by identifying the nonpriced good or service and charging a fee for its use equivalent to the externality. Of course, this is the classical foundation for Pigouvian taxation, and, in fact, a Pigouvian tax can be understood as a user charge if the service for which it is being charged is defined widely enough (e.g., "pollution-carrying capacity of air" may be the service for which fiscal authorities charge through a Pigouvian excise tax on emissions). Critics of user charges for externalities argue that the existence of externalities per se does not justify user charges if the government does not know the true extent of the externality. They underscore that markets have oftentimes been successful in eliminating potential externalities such that excludable public goods (such as pay TV) are frequently provided by private enterprises.⁷¹

The second theoretical justification of user charges rests on *natural monopolies* for private goods. Natural monopolies are firms whose cost functions exhibit decreasing average costs over the relevant scale of production, primarily owing to large fixed costs compared to variable cost (e.g., electric power networks). Efficient pricing would require that price equals marginal cost; as average costs are declining (since marginal costs are lower than average costs), however, this pricing rule implies that the price will be lower than the

average costs, that is, the firm will be making a loss. An industry with such cost functions will be dominated by a monopolist who will raise prices such that a profit is assured, leading to a suboptimal provision of the good being produced. Government production of such a good can achieve efficiency if the user charge for the product is set at the level of marginal costs. Since such pricing will lead to a loss, however, the government has to finance its production through general revenue or to subsidize private production to assure a first-best outcome. Critics argue that the deadweight loss associated with the revenue generation for the subsidy needs to be taken into account when evaluating the optimality of such a scheme. Furthermore, they point out that government production would rarely take place at minimum cost and would also reduce the competitive pressure to lower costs and improve technology through innovation. In practice, the line between excludable public goods and private goods produced in a natural monopoly is likely to be hard to draw (e.g., highways).

As a corollary, the above suggests which goods or services may not necessarily be subjected to user charges. If a certain good or service is provided because of a *merit* foundation, that is, the government wants services to be consumed to a higher degree than they would be demanded at market prices (even in situations where major positive consumption externalities are not present), the application of economically efficient user charges would be self-defeating. This may be a problem confronting developing countries in numerous government programs aimed at improving social sectors such as education. Charging cost prices for primary education will often risk the attainment of social targets; charging for higher education, however, may lead to a more efficient allocation of resources and increase equity. Extending the last point, user charges are also inappropriate where certain goods or services are provided with a *redistributional* intention, i.e., where the idea is to provide certain in-kind goods or services in order to achieve some income redistribution (e.g., food stamps); of course, such a redistribution would be offset by levying user charges on the beneficiaries. The generally adverse redistributional effect of user charges does not hold if they are levied on goods or services with a high income elasticity (luxury goods). The prevailing view in public finance is, however, that such redistribution be better done through income subsidies than in kind.

In developing countries, situations are often found where the government provides a private good or service which is not subject to natural monopoly problems. The prevailing view is that both revenue and

⁷¹See Wagner (1991).

expenditure objectives for the budget as well as overall economic efficiency will be better served by the *privatization* of the provision of the particular good or service. Proponents of the use of user charges in such circumstances stress that the resources required for successful privatization may not be at hand in many instances.

User Charges and Taxes

As previously indicated, the actual distinction between taxes and user charges is sometimes hard to define as was demonstrated for Pigouvian excise taxes, if the "service" on which the tax is levied is defined on a wide enough scope. Nevertheless, there are substantial differences between user charges and taxes.⁷² On a conceptual level, some analysts have pointed out that user charges are voluntary in that economic agents can affect the payment of the user charge through their behavior, but that taxes are involuntary. This distinction, however, is usually not of practical relevance since, for example, also the income tax may be considered voluntary, as economic agents can affect the amount of their income tax through their labor-leisure choice while, on the contrary, the user charge for a driving license may not be voluntary in circumstances where the operation of a car is essential. Another legal distinction defines the difference according to intent: if the intent at the introduction of a fiscal measure, on the one hand, was general revenue collection, that measure is deemed a tax; if the intent, on the other hand, was to ration the provision of a particular good or service among competing users, that measure is deemed a user charge.

In more practical terms, a country deciding between the imposition of a tax or the levy of a user charge can do so by considering a catalog of features. First, the allocative impact of user charges may not always be desirable if user charges cannot be imposed uniformly. Toll roads provide a good example of this point: if not all roads can be made toll roads, the imposition of tolls on certain roads may lead to economically suboptimal substitution by economic agents to roads which do not charge tolls even if this implies longer distances and slower travel. In such a context, the imposition of an excise tax on gasoline would go further towards recuperating the costs associated with road traffic. A similar case can be made for the collection of waste disposal costs through taxation if one wants to avoid the adverse incentives under user charges to dispose of waste illegally.

Second, the user charge may enhance the more economic use of a good or service in a way that a tax cannot. For example, the tuition payment for public schooling would probably lead to a more efficient use of schooling than if schooling were financed from general revenue sources. As was indicated before, however, such incentives will have to be weighted against merit and income redistribution objectives.

Third, and extending the last point, different concepts of fairness have different bearing on user charges and taxes. If fairness dictates that the beneficiaries of certain government-provided goods or services ought to pay for them, a user charge is the more appropriate instrument. Conversely, if the ability to pay is considered as the overriding fairness principle, the application of a tax is indicated.

Fourth, if the administration of user charges is too complex or resource intensive, the alternative would be a tax that is as closely related as possible to the good or service the government is providing. For example, the manpower requirement for toll collection on roads may be too large so that the indirect collection of user fees through gasoline taxation may be more efficient.

Fifth, if the taxation of certain economic activities is already high, the imposition of user charges on goods or services which are used as input into these activities may worsen the overall economic allocation rather than improve it. This may often be a problem in developing countries where the tax base is limited.

Sixth, a government may find it useful to determine the composition of its budgetary expenditure to a certain extent outside the political process. This could be a second-best approach to help prevent certain essential budgetary outlays from excessive cutbacks in periods of fiscal adjustment. Or it may impose more (long-run quasi constitutional) discipline on the budgetary process that would otherwise be heavily influenced by short-run organized interest groups, politicians, and bureaucracy.⁷³ Such arguments normally favor user charges over taxes. Within the budget, user charges generally fund specific programs or agencies, while taxes other than social security generally flow into general revenues. This differentiation, however, gets blurred in the case of earmarking taxes if the taxed good or service is very close to the earmarked use (e.g., gasoline taxes that finance highway expansion and upkeep). But if the taxed service is very different from the earmarked use (state lotteries for education) the similarity with user charges disappears while the

⁷²See Richardson (1993).

⁷³See Wagner (1991).

overall budgetary structure still prevails. Arguments against earmarking include the political process as no longer determining the budget and earmarked resources providing incentives for the budgetary beneficiaries not to reduce their costs.

User Charges in Practice

Pricing

From the perspective of economic efficiency, user charges should reflect the marginal cost of the service. The easiest case where this would be possible is the case of zero marginal cost as, for example, for one more car's use of an uncongested highway. In this case, however, the cost of operation would have to be either financed through general revenues which are usually raised in a distortionary fashion or through certain—in general—second-best qualifications to the marginal cost pricing rule. Such qualifications can be in the form of price discrimination according to the relative elasticity of groups of demand (Ramsey pricing) or price discrimination in accordance with the relative capacity use (peak-load pricing). Other qualifications of the marginal cost pricing rule consist of two-part tariffs (where a fixed sum is charged plus a fee per unit of service, e.g., telephone services) or block rates.⁷⁴ There are cases, however, where the deviation from marginal cost pricing is efficient even when the marginal costs are zero—that is, in the case of externalities. The marginal cost of pumping one more ounce of effluent into a river may in fact be zero, yet the cost to society is not. Similarly, an admission fee of zero to national parks may not appropriately reflect the scarcity value of this resource.

The fundamental problem is, however, that in most cases, marginal cost is not observable so that the cost has to be estimated. This may be relatively easy when markets for comparable goods or services exist (e.g., parking spaces in the inner city). Critics, however, point out that—in general—this task is usually infeasible for a government that is subject to uncertainty and ignorance and also to certain strategic behavior which is aimed at distorting the cost of government-produced goods or services.⁷⁵ In the presence of such problems, the government will also not be able to determine the optimal capacity to supply, and the fees charged will lead to unknown cross subsidization. Such cross subsidization would then face the possibility of becoming subject to the political process. In a realistic macroeconomic environment where inflation is very often

present to a nonnegligible extent, even user charges whose prices had once been set optimally will have to be adjusted to keep pace with the general increase of the price level.

Identification of the user and intensity of use

A user is defined as an economic agent who is to any extent responsible for the depletion of a particular good or service. In cases where nonexcludable public goods are targeted for user charges, the question of how to deal with free riders arises. Identifying the actual users may oftentimes be difficult as is illustrated by the example of road users. The licensing of cars does not charge road users such as pedestrians, horses, and bicyclists. The imperfect identification of intensity of use may be illustrated by sewer use. In the absence of metering, a user charge on a sewer connection does not identify users according to their intensity of use. In cases where users or their intensity of use are imperfectly identified, cross subsidization among users will be the rule.

Types of user charges

The following typology of user charges is usually drawn:⁷⁶

- *User fees:* These are payments on services consumed to yield a direct benefit to the user. Examples include royalties on natural resources, canal, bridge, and highway tolls; lease and rental payments; and charges for recurring sales of resources (e.g., water, minerals, and timber) and products (e.g., power); use of land (e.g., for grazing livestock); use of facilities (e.g., natural parks); services (e.g., mail delivery, waste disposal); and permits and licenses.

- *Regulatory fees:* These are very much like a tax in that they are solely based on the government's sovereign power to regulate particular economic agents or activities. Examples of regulatory fees include passport and judicial fees, customs service user fees, patent and copyright fees. In contrast to user fees, regulatory fees may or may not benefit the user (e.g., fees for patents may be beneficial but fees for inspections of certain set standards may not). In the latter case, the economic rationale for the regulation is the compensation for externalities imposed by unregulated behavior. This holds for external costs as well as benefits (e.g., drug certification charges may be set lower than marginal cost to recoup the positive externality involved when curing patients infected with contagious diseases).

⁷⁴See Katz (1987).

⁷⁵See Wagner (1991).

⁷⁶See Richardson (1993).

Conclusions

- The difference between user charges and excise taxes is not clear-cut, and user charges may often be substituted for taxation and vice versa.
- User charges may augment efficiency if they reduce externalities or price the goods or services of a natural monopoly.
- The efficiency of user charges depends on the pricing of the goods or services concerned.
- In inflationary environments, user charges will have to be reset frequently.
- The fairness of user charges has to be judged according to the prevalence of the benefit principle over the ability-to-pay principle and the income elasticity of the goods or services concerned.

Environmental Taxes

DAVID C.L. NELLOR

- *What is the rationale for environmental taxes?*
- *What are the different types of environmental taxes?*
- *What factors influence the extent to which environmental taxes might be used?*

The increasing use of environmental taxes, albeit mainly in industrial countries, is moving in the opposite direction from the more general thrust of tax reform which has been toward neutral broad-based tax systems that permit lower tax rates. Contrary to this trend in tax reform, environmental taxes are directed toward changing the relative prices of productive inputs and consumer goods that are linked to environmental damage. Most notable is the prominence now given to the introduction of carbon/energy taxes as a vehicle to meet both environmental and revenue objectives.

This note has three main parts: first, it looks at the rationale for environmental taxes; second, it examines the nature of environmental taxes; and third, it considers the factors that influence the scope for and design of environmental taxes.

The Rationale for Environmental Taxes

Environmental objectives

Environmental damage arises when the social costs of an activity that uses an environmental resource ex-

ceeds the social benefits of that activity.⁷⁷ This divergence between social benefits and costs can arise owing to one or both of two factors. The first factor is market failure—the failure of markets to bring about a solution where marginal social cost and benefits are equated—which could arise, for example, when there are poorly defined property rights over forest use or there are emissions of waste into rivers or the atmosphere. The second factor is policy failure—the use of a microeconomic policy that changes relative prices so as to encourage excessive use of a natural resource—for example, the use of chemical pesticides or water resources may be subsidized by the government.

A variety of policy instruments are available to address these environmental problems. In the case of market failure, structural measures (such as land reform that include the definition of property rights), regulatory policies (such as those involved in forest management), or tradable permits (in the case of waste emissions), could be appropriate. In the case of policy-induced environment problems, removal of the policy or its modification may be appropriate. In yet other cases, taxes may provide a solution to environmental problems whether caused by market or policy failure. Economic instruments—policy instruments that use the price mechanism such as taxes and tradable permits—are often preferred by economists because they do not require a costly regulatory apparatus and encourage reduction of environmental damage by the least costly means.

The choice of policy instruments—regulatory or tradable permits versus tax—may depend on the source of uncertainty. If there is better information concerning efficient levels of consumption or production of a good but uncertainty in knowing how to set tax rates to achieve that level of production or consumption, a solution of tradable permits or regulation could be preferable. From an economic perspective, the issue may be to determine which will create the greatest cost if the policymaker is wrong—setting the quantity incorrectly or the price via a tax.

Tax policy objectives

Environmental taxes permit a given level of revenue to be raised with lower efficiency costs than otherwise possible. It is sometimes noted that environmental taxes provide a “double dividend” because they (1) reduce the social cost of environmental damage as well as (2) permit a reduction in the rates of other socially

⁷⁷This note uses this economic definition although it is recognized that the term “environmental damage” has taken on a variety of meanings.

costly taxes thereby contributing to an overall reduction in the social cost of the tax system. Environmental objectives are met by raising the tax rate on emissions until the marginal social cost of using environmental resources is equal to the marginal social benefit of using the resources. From a revenue perspective, the rate of tax should be set such that the marginal social cost of setting the tax rate is equal across alternative tax instruments. The attractiveness of garnering a double dividend, of reduced environmental damage and revenue without social cost from environmental taxes, should not be underestimated. Many estimates for the United States suggest that the marginal welfare cost of taxation is about one third or higher. Thus taxes, such as carbon taxes which have relatively large tax bases, could dramatically improve the efficiency with which revenues are raised.

Environment-Related Taxes

A variety of taxes may be related to the environment—four categories are noted here. The first two categories of taxes—Pigouvian taxes or indirect environment-targeted taxes—can resolve or ameliorate environmental problems by changing the relative prices of activities—thereby discouraging various activities—that result in environmental damage. The third category of taxes are taxes that have unintended—favorable or unfavorable—environmental implications. These taxes, such as income taxes, which have incentives encouraging certain forms of economic activity, have played an important role in environmental damage in some developing countries. The fourth category of taxes are those often labeled as environmental taxes, but which are revenue sources earmarked for expenditures on the environment, such as the feedstock taxes in the United States which are earmarked for the “Superfund” to clean up hazardous waste dumps.

Pigouvian taxes

Pigouvian taxes are the classic textbook solution to resolving environmental problems. These taxes are specific rate taxes levied on units of emissions or on the units of damage generated by an activity. The rate of tax per unit is set to equal the marginal social cost of an activity such that the total marginal cost of the activity is equated to its marginal benefit. The tax rate is specific, not ad valorem, because the rate of tax is set according to the damage generated by an activity rather than the price of that activity.

Pigouvian taxes are viewed as efficient solutions to many environmental problems because they use the price mechanism to encourage modification to economic activities which, in an ideal world, is less costly

to administer, and encourage an efficient reduction in damage compared with regulatory mechanisms. Taxes induce efficient allocation of pollution reduction across consumers and in the composition of that adjustment, across scale of the activity, technological change, and factor substitution.

There are, of course, a number of well-known practical difficulties in implementing Pigouvian taxes. The difficulty of determining the marginal social cost to set the correct tax rate is a major impediment to the ideal use of these taxes. There are also issues of monitoring, measurement, and compliance.

Indirect environmental taxes

In view of the practical difficulties in levying Pigouvian taxes, other taxes targeted to achieving environmental objectives can be employed. These taxes—termed indirect environmental taxes—are levied on the use of productive inputs or consumption goods where the use of those goods is related to emissions or environmental damage. Indirect environmental taxes change relative prices but are not levied directly on the damage or emission.

The case for indirect environmental taxes is thus made on one or both of two grounds.

- Where an input to production or consumption activities is and can only be used in fixed proportion to the emission. These cases arise when there is no “end-of-pipe” technology permitting modification of input usage that will influence emissions. Even in these cases, however, the danger is that taxing inputs may remove the incentive for innovation of such end-of-pipe technology that could reduce emissions.

- When taxes on inputs are the most cost-efficient policy. Alternative policies are evaluated recognizing the administrative costs of their implementation—this process may eliminate policy options that are ideal from a narrow efficiency perspective. This is probably the most common environmental rationale for input taxation and arises because the administrative costs of taxing emissions are prohibitive.

The efficiency of indirect environmental taxes is dependent on the nature of the link between the tax base and environmental damage. As noted above, a Pigouvian tax is levied directly on the environmental damage. An indirect environmental tax will be as equally efficient as the Pigouvian tax if it is levied on a tax base—such as inputs or final goods—that is linked by a definable functional relationship—ideally a fixed proportional relationship—to that damage. The less well defined the relationship between the use or consumption of the taxed goods and the environmental

damage, the less effective are these taxes as indirect environmental taxes. The relationship between the use of taxes and their effectiveness in securing environmental objectives can be illustrated by two indirect environmental taxes: a carbon tax and a petroleum tax.

A carbon tax is equally efficient as a Pigouvian tax because there is a fixed relationship between the tax base—fossil fuels—and the environmental damage. A carbon tax is intended to address global warming concerns arising from the emission of carbon dioxide that results from the combustion of fossil fuels. A Pigouvian tax would be levied on the emission of units of carbon dioxide. However, because there is no end-of-pipe technology that permits a change in the relationship between the combustion of fossil fuels and emissions of carbon dioxide, a tax on the fossil fuels is equivalent in its effect to a Pigouvian tax—there is a fixed proportional relationship between the use of the fuel and the emissions.

Petroleum taxes intended to address local air quality concerns are not as efficient as Pigouvian taxes on emissions or damage; there is no fixed relationship between the use of petroleum and environmental damage. A tax on petroleum is not related to the emission of pollutants because the pollutants are also a function of the vehicle's operating efficiency, driving speed, road quality, etc. In this case, although a tax on petroleum may reduce pollution, it is not an efficient policy from a theoretical perspective. An efficient tax on vehicle emissions would likely result in a reduction in emissions from a variety of reactions to the increased cost of emissions depending on the least-cost means of reducing emissions. For example, emissions could be reduced by lower mileage traveled, improved vehicle maintenance, and technological adjustment, such as the use of catalytic converters. Indirect environmental taxes such as petroleum taxes do not encourage adjustment on all of these margins. In fact, they may discourage the use of some methods of emissions adjustment, such as changes in the use of catalytic converters.

Taxes with unintended environmental implications

Some taxes have unintended environmental implications. Excises on various energy products are often viewed as environmentally favorable when they discourage environmentally damaging activities. Taxes could, however, unintentionally have environmentally harmful consequences by creating distortions that cause environmental damage. For example, an income tax may favorably treat agricultural investment that encourages capital intensive activities in areas unsuited to that form of agriculture.

Earmarked taxes

Some taxes are labeled as environmental taxes but are taxes that raise revenue earmarked for environmental purposes rather than taxes that change the relative price of using environmental resources. There are sound fiscal arguments against the use of earmarked taxes; they imply a coincidence between the level of revenue raised and the expenditure requirement, and they discourage effective evaluation of expenditure alternatives. In some countries, however, tax measures have been "legitimized" by identifying the importance of the environmental expenditure to which they are put.

Factors Influencing the Scope for and Design of Environmental Taxes

In considering tax reforms that may meet environmental objectives, the policymaker has two general considerations. First, in reviewing all taxes, consideration can be given to whether or not there are special incentives or tax rate preferences which might unintentionally result in environmental damage. Second, the policymaker can consider what role Pigouvian and indirect environment-targeted taxes can play. In the following text, the focus is on the scope and design of environment-targeted taxes.

Pigouvian taxes are difficult to define and *administer*. Efficient setting of a Pigouvian tax requires determining the tax base of emissions or damage and setting a tax rate such that the marginal social cost of environmental damage is equal to the marginal cost of abatement. Determining the shape and nature of these damage and cost functions, even within reasonable degrees of accuracy, is a considerable challenge. Many of these difficulties—specific to environmental taxes such as ecological valuation and damage measurement—apply to varying degrees to indirect environment-related taxes.

Many environmental concerns have a *spatial or temporal dimension*, and it can be difficult to structure a tax related to the damage or emission when this is the case. For example, the costs of air pollution from automobiles are highest in urban areas and often at particular times of the day. Taxes on gasoline, for example, are blunt instruments to deal with these aspects of environmental damage. Work at the World Bank has suggested using a combination of taxes and regulatory devices as the best method to address this difficulty.

Other aspects of environmental damage may be exacerbated by the imposition of an environmental tax even if a link between the tax and a source of environ-

mental damage is established. A commonly mentioned example is the use of a tax on petroleum fuels in a poor country that exacerbates the costs of market failure in forests. In Thailand, for example, a tax on chemical fertilizers, which in most circumstances is environmentally beneficial, resulted in environmental damage because it encouraged extensive farming, rather than intensive farming, by forest clearing on land where property rights were poorly defined. The extent of market and policy distortion is probably greater in many developing countries.

Environmental taxes are likely to be ineffective if there is *macroeconomic instability*. Setting a specific environmental tax is wasted effort when rates of inflation are high. Thus, the type of fine tuning of environmental taxes discussed in industrial countries may not be appropriate in all countries.

Environmental taxes may not have the desired *incentive effects* of modifying production methods that reduce environmental damage. Rather, companies such as state enterprises that are not profit maximizing pass on environmental taxes without seeking to reduce the tax burden by modifying their production methods. This is an important concern in the case of economies in transition but also in many developing countries where public utilities and enterprises may play an important role in the economy.

There are also *political economy concerns*. First, there is a danger that the use of environmental taxes, by intentionally using the tax system to modify incentives, will encourage numerous other demands to use the tax system for special treatment of specific activities. The experience with special tax provisions is not encouraging. Second, a political impediment to the introduction of environmental taxes is the argument that they harm international competitiveness. Partly as a result of concerns regarding international competitiveness, many proposals for environmental taxes have been made at the international level. For example, the European Community has proposed that a carbon tax be introduced in its member countries, but its implementation is dependent on other major countries introducing measures with comparable effect. These international agreements are inevitably difficult to complete.

There is a potential conflict between *revenue objectives* and *environmental targeting*. One tax policy instrument is unlikely to efficiently achieve both objectives. The nature of the possible trade-off between revenue and environmental objectives will vary from case to case. For example, in the presence of severe environmental damage, the tax rate may need to

be set so high to meet environmental objectives that there is an inverse relationship between meeting revenue and environmental objectives. Revenue objectives that call for a tax rate that exceeds the rate justified by environmental objectives, however, is perhaps the most likely case. For a given revenue objective, the tax rate should be higher than that justified by environmental considerations if the tax elasticity is greater than zero at the environmental optimum based on the presumption that other taxes have social costs. In these circumstances, an additional dollar of revenue can be raised by increasing the rate of environmental tax and reducing other tax rates with a net reduction in social costs of the tax system.

Raising environmental taxes may conflict with *equity objectives*. For example, the empirical literature qualifies, although it does not refute, the common perception that a carbon tax will be regressive. Raw data for the United States support the conclusion that a carbon tax is regressive; the percent of income going to fossil fuel consumption in the lowest decile of income is 10.1 percent compared with 1.5 percent of the highest decile of income. European data, however, do not unambiguously support this conclusion. Other factors suggest that the tax may not be as regressive. For example, using permanent income to assess the progressivity of carbon taxes shows that the tax is considerably less regressive and, in a number of European countries, it is no longer regressive at all. In developing countries, institutional factors may mean that a carbon tax would not be as regressive as it would appear on the surface. The prevalence of price controls that pass forward of taxes is sometimes illegal and the likely price inelasticity of supply all reduce the prospect of forward shifting of the tax, making it more likely that it will be borne by capital owners and thus more progressive.

Conclusion

A variety of policy instruments are available to address environmental problems that arise when the social costs of an activity that uses an environmental resource exceeds the social benefits of that activity. Economic instruments—policy instruments that use the price mechanism, such as taxes and tradable permits—are often preferred because they do not require a costly regulatory apparatus and encourage reduction of environmental damage by the least costly means. Fiscal policy objectives can also be enhanced by environmental taxes because they permit a given level of revenue to be raised with lower efficiency costs than otherwise possible. Environmental taxes are thus said to provide a “double dividend” because they (1) re-

duce the social cost of environmental damage as well as (2) permit a reduction in the rates of other socially costly taxes, thereby contributing to an overall reduction in the social cost of the tax system.

A variety of taxes may be related to the environment—four categories are noted here. The first two categories—Pigouvian taxes or indirect environment-targeted taxes—can resolve or ameliorate environmental problems by changing the relative prices of activities—thereby discouraging various activities—that result in environmental damage. The third category is that of taxes having unintended—favorable or unfavorable—environmental implications. The fourth category is that of taxes often labeled as environmental taxes, but which are revenue sources earmarked for expenditures on the environment.

In considering tax reforms that may meet environmental objectives, the policymaker has two general considerations. First, in reviewing all taxes, consider-

ation can be given to whether or not there are special incentives or tax rate preferences which might unintentionally result in environmental damage. Second, the policymaker can consider what role Pigouvian and indirect environment-targeted taxes can play.

In view of the practical difficulties in levying Pigouvian taxes, other taxes targeted to achieving environmental objectives can be employed. These taxes—termed indirect environmental taxes—are levied on the use of productive inputs or consumption goods where the use of those goods is related to emissions or environmental damage. The scope for these taxes and their design is influenced by a number of factors, *inter alia*, administrative factors, the spatial or temporal dimension of the environmental damage, other aspects of environmental damage, macroeconomic conditions, industrial structure of the economy, political economy issues, potential conflicts between revenue and environmental objectives, and equity objectives.

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IV

INCOME AND WEALTH

TAXES

The Concept of Income

JOHN R. KING

Income is not a simple concept. In the theoretical literature, several alternative definitions have been proposed and none of them has achieved universal acceptance as an appropriate definition for all purposes. But practical and reasonably precise measures of the income of an individual or a business in a particular period of time are needed, not only for tax purposes, but also for other purposes—such as financial reporting by a company to its shareholders, and social accounting by governments. In the absence of a single, universally accepted theoretical definition of the concept of income, many aspects of these practical measures remain controversial.

Theoretical Definitions of Income

In what is probably the most influential definition of the personal income of an individual, in a particular period of time, Henry Simons asserted it to be the following:

The algebraic sum of: (1) the market value of rights exercised in consumption; and (2) the change in the value of the store of property rights between the beginning and end of the period in question. In other words, it is merely the result obtained by adding consumption during the period to "wealth" at the end of the period and then subtracting "wealth" at the beginning.¹

Similar definitions had been advanced in earlier writings by R.M. Haig (1921) and G. von Schanz (1896), and so this is often referred to as the Schanz-Haig-Simons (SHS) definition. All three writers were concerned to find a measurable concept which would serve as an adequate basis for a personal income tax system. Such taxes had already been in existence in some countries, of course, for many years. In general, however, they had been based on an underlying concept of income as a *flow* (or yield) of services from specific sources—separate and distinct from any changes in those sources

themselves. Since the SHS definition brings changes in wealth within the income definition, on a par with such services, it is commonly referred to as a definition of "comprehensive income." A central feature of this definition is that it requires appropriate procedures for valuing "wealth" at the beginning and at the end of the income period.

In subsequent writings, Hicks offered an alternative, broad definition of an individual's income in a given week as "the maximum value which he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning." Elaborating on the concept of "well-offness" in this broad definition, he reformulated the definition as "the maximum amount of money which the individual can spend this week, and still expect to be able to spend the same amount *in real terms* in each ensuing week."²

The obvious difference between the SHS definition and that of Hicks is the importance that the latter accords to the subjective expectations of the individual. Hicks was, explicitly, not proposing a definition for use as a practical basis for an income tax. Indeed, in commenting on the difficulty that would be faced by a statistician who might seek to apply his definition in measuring the social income in an economy, Hicks advised that:

The best thing he can do is to follow the practice of the income tax authorities. But it is the business of the theoretical economist to be able to criticize the practice of such authorities; he has no right to be found in their company himself!³

Nevertheless, many particular features of income tax systems are based in practice on something that seems closer to Hicks's definition than to that of SHS. This definition remains, therefore, an important source of theoretical support for certain departures from the SHS comprehensive tax base.

¹See Simons (1938), p. 50.

²See Hicks (1946), p. 172.

³Ibid, p. 180.

Personal Income Tax

Theory of Optimal Income Taxation

HOWELL H. ZEE

- *What is the nature of the trade-off between efficiency and equity?*
- *What problems does the theory of optimal income taxation address?*
- *What are the main economic implications that can be drawn from the literature on optimal income taxation?*

The theory of optimal income taxation brings together the efficiency and equity consequences of taxation—the two fundamental concerns of tax policy that hitherto have only been separately dealt with, respectively, in the first two sections of Chapter II. In principle, there is, of course, no reason why equity issues cannot also be integrated into the theory of optimal commodity taxation (see Chapter III).⁴ Indeed, general optimal commodity tax rules in the multi-person setting have been derived in the literature. These rules, however, have little policy relevance, since it is seldom feasible in practice to impose, on a broad scale, differential tax rates on consumption to achieve equity objectives.⁵ Hence, the taxation of income remains the most relevant setting for addressing the combined efficiency and equity concerns of the policymaker.

Trade-off Between Efficiency and Equity

At the heart of the theory of optimal income taxation is the trade-off between efficiency and equity. It is, therefore, important to understand the nature of this trade-off before embarking on a formal analysis of the optimal income tax problem. It will be recalled from Chapter II that the only tax which entails no efficiency

loss is the lump-sum levy. Hence, if such levies are feasible, the problem would be reduced to one purely of equity, and the issue of the trade-off would not arise. In reality, of course, any attempt at income redistribution has to be carried out through the use of distortionary taxes, such as the income tax. The more they are relied upon to effect an income transfer from the rich to the poor, such as by increasing the progressivity of the income tax structure, the higher the efficiency costs they will impose on society. The optimal trade-off point is reached when the marginal enhancement to equity from an additional unit of income transfer is just worth the marginal efficiency cost of that transfer.

Utility possibility frontier

The efficiency cost associated with an income tax is in its disincentive effect on work effort, particularly at high tax rates.⁶ In an economy in which individuals differ in their productivities—and therefore in their before-tax incomes, their after-tax incomes will, in general, also be different under any reasonable income tax system.⁷ Now, if the relative tax burdens between the rich and the poor are altered, subject to a given government revenue requirement, with a view to reducing the inequality in their after-tax incomes (or utilities), at moderate tax burdens, the reduction in the rich's utility could probably be accompanied by an increase in the poor's utility. At high tax burdens, however, a point will soon be reached where the tax's disincentive effects are so pronounced that any further increase in the tax burdens would reduce the utilities of both the rich and the poor. In the limiting case of complete equality, the equality is realized only because the incomes (and utilities) of both have been

⁴For a treatment of the optimal taxation problem under fairly general conditions, see Mirrlees (1976).

⁵A limited application of differential consumption taxation is certainly feasible, and in fact widely practiced, as many countries tax important mass consumption items at rates lower than the standard rates in their value added or general sales tax systems. The effectiveness of this practice in achieving equity objectives is, however, highly questionable, as items taxed at the preferential rates are typically consumed by both the rich and the poor.

⁶The discussion here is limited to a static framework. In an inter-temporal context, an income tax distorts saving-consumption decisions as well.

⁷It will be assumed from now on that any difference in individual welfare (or utility) between two individuals is entirely due to a difference in their after-tax incomes, and not due to a difference in the ways they *value* their incomes. This amounts to assuming that all individuals have the same utility function, or equivalently, have the same preferences (see Chapter II for a more extended discussion of the concept of the utility function). This assumption is commonly invoked in the literature. Without it, the optimal income tax problem is much less tractable, since in this case, optimality will then depend on one's (inevitably arbitrary) assumption about how preferences differ across individuals.

reduced to zero.⁸ This is illustrated in Panel (a) of Figure IV.1 for a two-individual world, where the utility levels of individuals 1 and 2 are respectively denoted by U^1 and U^2 and measured along the horizontal and vertical axes.

For any given level of utility for one individual, there is (are) a maximum attainable level(s) of utility for the other individual. A curve that traces out all such utility combinations is called a utility possibility frontier (UPF).⁹ Hence, point A represents the maximum U^2 when U^1 is zero.¹⁰ As individual 2's income is being redistributed toward individual 1 through an increase in the progressivity in the income tax system, there will initially be a range of redistributions where the UPF is negatively sloped (segment AR). Once point R is reached, however, any further redistribution through the distortionary tax system can only reduce both individuals' well-being; the segment of UPF beyond point R (segment OR) is accordingly positively sloped. Indeed, the closer it approaches the 45-degree line representing complete equality, the lower the utility levels of both individuals. Ultimately, complete equality is attained at the origin where $U^1 = U^2 = 0$. The most important insight provided by this construct is that the UPF lies entirely to one side of the 45-degree line, thus underscoring the enormous efficiency cost to society in achieving complete equality.¹¹

Optimal distributions

How should the policymaker choose a particular distribution of individual utilities on any given UPF,¹² so as to maximize social welfare? The answer clearly lies in the particular notion of distributive justice he subscribes to. In Panel (b) of Figure IV.1, the UPF in Panel (a) has been reproduced, but with the iso-welfare contours of three benchmark theories of distributive jus-

⁸A simple mental experiment will make this point clear. Consider a two-individual world in which the income tax revenue from individual 2 is used exclusively to subsidize individual 1, who otherwise has no income. At moderate tax rates where the disincentive effects of the tax are relatively small, an increase in the tax rate would most likely yield more revenue, with the consequence that individual 1 gains at the expense of individual 2. At high tax rates, however, individual 2's work effort is so discouraged that any further increase in the tax rate would actually reduce the revenue yield, thus lowering individual 1's well-being as well. See Baumol (1986) for a discussion of the trade-off involved.

⁹Conceptually, the utility possibility frontier is completely analogous to the more familiar production possibility frontier.

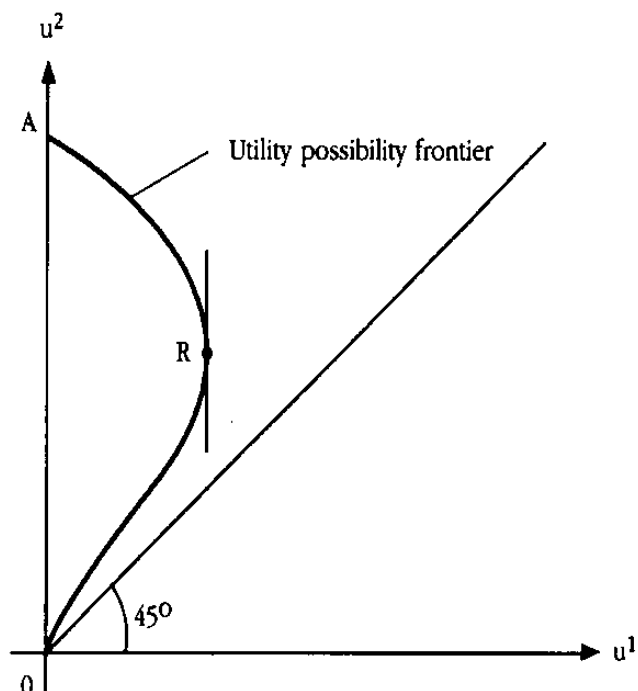
¹⁰In terms of the simple mental experiment referred to earlier, point A would represent a situation where individual 2's income is not taxed at all.

¹¹The UPF in Panel (a) of Figure IV.1 can be drawn on either side of the 45-degree line, depending on one's initial starting point.

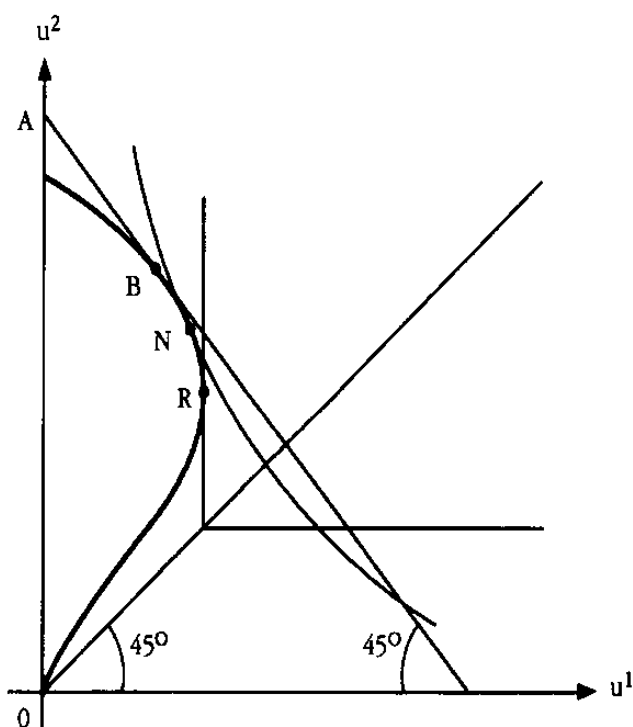
¹²The exact shape and location of a UPF are determined by the preferences of the individuals (i.e., their utility functions), and the nature of the tax system in effecting the redistribution.

Figure IV. 1.
Utility Possibility Frontier and
Optimal Distributions

(a) Utility possibility frontier under distortive taxation



(b) Optimal distributions under different distributive justice



tice, developed in Chapter II, superimposed on it. The optimal distributions under the utilitarian, Nash, and Rawlsian theories are given, respectively, by points B , N , and R . While it should come as no surprise that the Rawlsian (utilitarian) distributive justice produces the most (least) egalitarian outcome among the three, all three optimal points, even in the limiting case of Rawls, provide for some degree of inequality to prevent the complete disappearance of efficiency in society. Hence, complete equality of well-being across individuals can seldom be an outcome where social welfare is maximized,¹³ even if the policymaker attaches great weight to distributive objectives in taxation.

Optimal Income Taxation

Defining the problem

In view of the nature of the trade-off between efficiency and equity discussed above, what can be said about the optimal degrees of income tax progressivity under different theories of distributive justice? Models of optimal income taxation, which seek to provide an answer to the aforementioned question, have the following important common elements: (1) there is a known distribution of (otherwise identical) individuals with differently endowed productivities (skills), thus giving rise to different levels of individual pretax income; (2) the government's objective is to maximize a given social welfare function,¹⁴ with the income tax as its only instrument, subject to a given revenue requirement (which could be zero, in which case, the tax is used only for redistributive purposes); and (3) the income tax produces a disincentive effect (its efficiency cost) through its impact on an individual's work effort.

The above government maximization problem has been investigated on the basis of a variety of social welfare functions, including the limiting cases of the utilitarian and Rawlsian formulations of distributive justice.

Main results and implications¹⁵

A number of important results, some fairly intuitive but a few quite surprising at first blush, have been obtained from solving the optimal tax problem defined above.¹⁶

¹³The obvious exception is, of course, the uninteresting case where all individuals are identical in *every* aspect, in which case, no deviation from equality is ever compellingly justifiable.

¹⁴See Chapter II for a discussion of the concept of the social welfare function.

¹⁵See, for example, Atkinson (1983), Phelps (1973), Seade (1977), and Sheshinski (1972).

¹⁶For simplicity, it will be assumed that the government's net revenue requirement from the income tax is zero.

First, in the case of a *linear income tax schedule*, that is, $t = \alpha + \beta y$, where t is tax revenue, y is pretax income, and α and β are (constant) tax parameters, the optimal solution implies that $\alpha < 0$ and $1 > \beta > 0$, that is, it is optimal to have a guaranteed minimum income (equals $-\alpha$) and a positive (but less than unity) marginal tax rate, so that the income tax schedule is basically progressive.¹⁷ Moreover, the higher the degree of society's aversion to inequality (i.e., the lower the value of the parameter ϵ in the social welfare function),¹⁸ the higher the optimal marginal tax rate β .¹⁹ The precise value for the optimal β depends, of course, on a number of factors, including the nature of the distribution of individual productivities, the sensitivity of an individual's utility to income variations, and the elasticity of his labor supply.²⁰

Note that even if the social welfare function is utilitarian, that is, with $\epsilon = 1$, some redistribution is still called for. This is primarily because a unit of income has a much higher value to the poor than to the rich. Hence, society as a whole would generally gain from the redistribution even when it has no aversion to inequality per se. The obvious exception to this would be if an individual's valuation of his income does not vary across income levels (the case of constant marginal utility of income), then under utilitarian distributive justice, the optimal marginal tax rate would be zero.

Second, in the case of a *general income tax schedule*, that is, $t = t(y)$, so that the marginal tax rate is allowed to vary across income levels, the optimal income tax problem becomes significantly more difficult to solve, since now, a complete solution would involve determining an entire nonlinear schedule. Indeed, even with fairly simple model structures, research in this area so far has yielded only limited insight on the optimal shape of the entire tax schedule. Nevertheless, two fundamental results have been obtained: (1) the optimal marginal tax rate is nonnegative (but, of course, less than unity) throughout the entire income range, and (2) the optimal marginal tax rates at *both* the top and bottom ends of the income range are zero. These results hold irrespective of the underlying formulation of distributive justice.

The first result establishes the important property that there are no income ranges where the optimal tax

¹⁷Clearly, with a linear income tax schedule, the concept of progressivity must be defined on an average rather than marginal basis.

¹⁸See Chapter II for a discussion of the parameter ϵ .

¹⁹Simulations have shown, however, that even Rawlsian distributive justice (i.e., as ϵ approaches $-\infty$) typically does not lead to very high optimal values for β .

²⁰It will be recalled from Chapters II and III that, under certain circumstances, the efficiency loss of a tax is inversely related to the elasticity of demand or supply of the taxed commodity.

schedule falls as income rises. The second result provides the biggest intuitive surprise in this literature: it implies that, as one moves from the low to the high ends of the income range, the optimal marginal tax rate first rises and then *falls* at some point at high income levels—ultimately falling to zero at the top level. To understand this seemingly counterintuitive outcome, particularly in cases where society has some aversion to inequality, it is necessary to realize that a change in the marginal tax rate at any income level only affects individuals situated at that level and above. The smaller the number of individuals with incomes above that level, the more important the efficiency relative to redistributive consequences of the tax will become. Since by definition, no individuals will be situated above the top income level, the optimal marginal tax rate there is thus entirely determined by efficiency considerations.²¹ This reasoning is, therefore, independent of the particular theory of distributive justice adopted.

As noted earlier, the optimal shape of the tax schedule, except at its end points, and that it should not fall as income rises, are not well understood. Hence, the optimal zero end-point tax rate outcome may well lead to a misguided design of the tax schedule as a whole. In fact, numerical simulations of optimal income tax models have revealed that, under a variety of assumptions concerning the nature of the individual utility function and the distribution of individual productivities, the curvature of the optimal tax schedule is not very pronounced across alternative formulations of the social welfare function; that is, it can be approximated by a tax schedule with only a few linear segments.

The basic insight to be grasped from the theory of optimal income taxation is that the importance of achieving redistributive goals through increasing the progressivity of the income tax system should not be overemphasized, as the efficiency costs of doing so are likely to be extremely high.

The Base of the Personal Income Tax

JANET STOTSKY

- *What is the difference between a global and schedular income tax?*
- *How do income tax systems arrive at the concept of taxable income?*

²¹The zero optimal marginal tax rate at the bottom income level arises from similar efficiency considerations. As there are no individuals situated below that level, there are no redistributive gains to be had by applying a positive marginal tax rate there.

- *What is the rationale for some typical deductions from income?*
- *How do we make a tax system neutral to inflation?*

Income tax systems can be designed on either a global or schedular basis, although, in practice, most global income tax systems have schedular features and some schedular income tax systems have global features. A global income tax aggregates all sources of income while a schedular income tax imposes tax on each source of income separately. Global income taxes generally are used in industrialized countries, while schedular income taxes are more commonly found in developing countries. Many developing countries have adopted global income taxes in form though they may be administered similarly to a schedular tax with heavy reliance on withholding and few taxpayers filing final returns or being assessed on global income.

There are several advantages to a schedular income tax. The main advantage is that it may be more easily administered in countries without a sophisticated tax administration. Tax generally is collected by withholding so that the number of taxpayers who must file returns can often be significantly reduced with a schedular system. Moreover, the administrative advantages are greatest if there are few taxpayers with multiple sources of income. An additional advantage is that a schedular tax allows for different treatment of different types of income if a country wants to tax either labor income, capital income, or certain kinds of capital income more lightly. This differential treatment, however, can be obtained under a global income tax with schedules for particular kinds of income, as is typical.

The main advantage of a global income tax is that goals of vertical equity more easily can be achieved since the tax is based on an aggregate measure of income. It may also have administrative advantages if there are many taxpayers with multiple sources of income, because only one return is filed for each taxpayer. Schedular systems often end up with a patchwork of overlapping schedules, multiple exemptions for the same income, high marginal tax rates, and so on.

Under all income tax systems, the base of the personal income tax falls far short of the SHS notion of income. The starting point is "gross income," defined differently in each tax code. Although termed gross income, this definition of income may be in part a net or gross concept. Under an SHS notion of income, "gross income" would consist of wages and salaries, business income (e.g., partnerships, sole proprietorships, farm

income), capital income, rents, royalties, fringe and in-kind benefits, imputed rent from consumer durables, income transfers, pension income, and gifts and bequests.

Some components of income usually are excluded from gross income, meaning that they are not even included in the concept of gross income for the purposes of the income tax. Gifts and bequests, while taxable to the decedent's estate, are typically excluded from income. Death benefits and disability or sickness benefits are also typically excluded from income on the grounds that they represent compensation for a loss rather than an increase in an ability to consume.

The treatment of fringe benefits varies greatly across income tax systems. Some income tax systems exclude all employer-provided fringe benefits from employee taxable income. Others impute some value for these fringe benefits and tax them at either the employer's tax rate or at the employee's tax rate. Still other tax systems deny a deduction at the company level for the cost of the fringe benefits. The imputed value for tax purposes should be market value. If employees value these fringe benefits at less than their market value, then these benefits should be valued at their cash equivalent value. Fringe benefits are rarely valued at market value. Often these fringe benefits are valued at some proportion of the employee's wages or on some other arbitrary basis. The tax exclusion of fringe benefits generally results in significant erosion of the tax base. It leads to a higher demand for fringe benefits, because fringe benefits are effectively purchased out of pretax income. It also leads to an erosion in the progressivity of the tax code because fringe benefits are disproportionately provided to highly compensated employees.

Imputed rent from consumer durables is in most cases excluded from tax. The largest component of this imputed rent is on owner-occupied homes. This imputed rent would be properly measured as the gross rent minus any costs associated with the home. In part, this exclusion stems from the administrative difficulties in measuring the value of the imputed rent and in part, it stems from the political unpopularity that would be associated with any attempt to tax this nonmonetary form of income. The tax exclusion, however, results in encouraging homeownership, which is generally considered a socially worthwhile goal. Nevertheless, the exclusion of imputed rent creates inefficiencies and inequities.

Income transfers are also typically excluded from tax. Income transfers take a variety of forms and the rationale for taxing them differs. Transfers from public

pensions, such as social security, may in part represent payment for previous taxes paid. To the extent that social security taxes are not deducted from taxable income when they were contributed, the benefits are properly excluded from income when paid out. Many income tax systems, however, allow taxpayers to exclude social security taxes from taxable income. In this case, the benefits are properly included in income when paid out. Unemployment compensation and aid to low-income households may also be excluded from tax, although, if income below some threshold is not subject to tax, there is no persuasive rationale for this on efficiency or equity grounds. In-kind transfers to low-income households should also be included in income, but this again poses the problem that their value to the recipient may be lower than their monetary cost. Thus, it would be fair to tax the recipient only on the cash equivalent value.

Many kinds of capital income are frequently not included in the income tax base in developing countries. Dividends and interest on certain forms of savings are often explicitly tax exempt. The rationale for this exclusion is to encourage capital investment. Nevertheless, the favorable treatment afforded capital income may lead to inefficiencies in encouraging only tax-favored forms of investment and inequities in reducing tax burdens on higher-income taxpayers who earn most of the capital income. Capital gains is an area that introduces considerable complexity into an income tax and as a consequence, many developing countries do not include capital gains in income. These issues are discussed later in Chapter IV.

Taxable income is defined as gross income minus tax reliefs. Income tax systems differ in how they reduce gross income to taxable income. Tax relief can take the form of adjustments, deductions, exemptions, allowances, and credits. Adjustments to income are generally tax reliefs that are available to all taxpayers. For instance, alimony paid or pension contributions are typically adjustments in that all taxpayers may reduce their gross income by these amounts.

Under some tax systems, adjustments are grouped with other deductions and these deductions are available to all taxpayers. While under other tax systems, deductions take the form of a standard deduction or itemized deductions, and the taxpayer is left the option of choosing the most beneficial approach. The standard deduction may vary across characteristics of the filing unit or taxpayer. Taking other characteristics of the tax system as unchanged, standard and itemized deductions reduce the tax burden on the taxpayer by the product of the taxpayer's marginal tax rate and the amount claimed as a deduction. Their value is thus di-

rectly proportional to the marginal tax rate of the taxpayer. Itemized deductions typically benefit higher-income taxpayers more than lower-income taxpayers because higher-income taxpayers are more likely to incur expenses that are itemizable. Allowable itemized deductions vary across income tax systems, but may include unreimbursed employee business expenses, charitable contributions, educational expenses, pension contributions, life insurance contributions, personal and mortgage interest payments, medical and dental expenses, taxes paid to other governments and social security tax payments, and casualty or theft losses.

There are various arguments given in favor of allowing these items to be deducted from income. The rationale for allowing a deduction for unreimbursed employee business expenses is that income should be measured net of expenses incurred in earning it. The rationale for allowing charitable contributions, educational expenses, pension contributions, and life insurance contributions to be deducted rests primarily on the argument that the deduction encourages a higher level of these activities and they are socially beneficial activities. The extent to which the deduction encourages a higher level of these activities depends on the price elasticity of demand.

The rationale for allowing a deduction for mortgage interest is to encourage more homeownership. This deduction for interest would be justified if the imputed income from homeownership were taxed. There is little rationale for allowing a deduction for other personal interest, since this interest is generally incurred in purchasing goods that have no particular social merit and thus this deduction favors consumption over savings.

There are several arguments in favor of allowing a deduction for medical and dental expenses, and taxes paid to other governments and social security tax payments. One argument is, as noted above, that the deduction encourages socially beneficial activities (i.e., good health and greater provision of government services). Another argument is that these expenses are to some extent involuntary and reduce the taxpayer's ability to pay. This rationale has its limitations. Many medical and dental expenses are voluntary and some such expenses are incurred by most taxpayers. It may, therefore, be appropriate only to allow a deduction for extraordinary expenditures on medical or dental care. Taxes are paid to other governments, and for social security tax payments in return for services. It may, therefore, be inappropriate to view them as reducing a taxpayer's ability to pay. The deduction for casualty and theft losses is also based on the notion that such

losses impair ability to pay, although, here again, this applies only to extraordinary losses.

In some cases, these deductions may only be taken in full if they exceed a threshold or may only be taken to the extent that they exceed a threshold. The threshold is typically based on gross or taxable income. Although these thresholds are frequently imposed for revenue reasons, the rationale for such thresholds is that only extraordinary expenses impair ability to pay and should be allowed as a deduction. In some cases, deductions may be limited to a certain proportion of gross or taxable income, again, generally for revenue reasons and to prevent tax evasion. Itemized deductions may be phased out for some higher-income taxpayers, as well, effectively raising their marginal tax rate in the phase-out range.

In addition, many income tax systems allow personal exemptions or family allowances to be deducted. These exemptions are typically based on the number of individuals in the filing unit and may also be related to characteristics of the filing unit. Personal exemptions, like deductions, reduce the tax burden by the product of the marginal tax rate and the amount claimed as an exemption. Their value is thus also directly proportional to the taxpayer's marginal tax rate. Some income tax systems in developing countries have eliminated personal exemptions because the tradition of extended families makes it difficult to determine the number of people in the household. Some tax codes have converted these personal exemptions into a credit against taxes to enhance the equity of the tax system because a credit reduces the tax burden by the same nominal amount regardless of the taxpayer's marginal tax rate.

Once taxable income has been defined, the income tax code specifies rates and brackets that apply to this income. There is considerable variation in the rates and number of brackets across income tax systems. Marginal tax rates vary from 1 percent to close to 100 percent, although a typical maximum rate is about 40 percent. Some tax systems have as few as two or three rates and brackets, while others have more than ten. If there is a system of joint filing, different schedules may apply to different filing units.

After computing tax on taxable income, the individual taxpayer may be allowed to claim certain tax credits. These credits vary but are often designed to provide tax relief to low-income households and married couples. Credits are also frequently allowed for taxes paid to other countries on foreign source income that is also subject to domestic tax. These credits are typically nonrefundable, that is, they cannot be

claimed by taxpayers with no positive tax liability, but in a few cases, they may be refundable. Refundable credits require an able tax administration to deter tax evasion.

Certain forms of income may be taxed on a scheduled basis using the same rate schedule and brackets as the income tax or using an entirely separate schedule. In some countries, pension income, capital gains, partnership income, individual proprietors' income, farm income, fringe benefits, and other forms of income are treated on a scheduled basis, entirely separate from the rest of the income tax.

Inflation interacts in many ways with the individual income tax. Any magnitudes in the income tax that are set in nominal terms, such as brackets and tax reliefs, change in value with inflation. If brackets are left unchanged in nominal terms, then in the face of inflation, which raises nominal incomes, taxpayers are pushed into higher tax brackets. This phenomenon, known as bracket creep, is one means by which the average tax rate rises over time. To prevent bracket creep, the brackets may be indexed to changes in the overall level of prices. Standard deductions, personal exemptions, and credits are also set in nominal terms and lose value in the face of inflation if they are not indexed to changes in the overall level of prices. Some income tax systems index all of these nominal magnitudes to inflation, but the record is that governments often renege on promised inflation adjustments. In some cases, however, these nominal magnitudes are adjusted periodically, giving governments more budget flexibility and the opportunity to score political points with taxpayers by offering them a tax cut when they are merely counteracting the effect of inflation.

The taxation of capital income is another area where inflation interacts with the tax code to change real tax burdens. Capital gains are typically taxed on a nominal basis. Some tax codes index capital gains to inflation, for example, the United Kingdom, but this introduces certain administrative complexity and raises issues as to the proper means of indexing. In addition, nominal interest rather than real interest is generally taxable when received as income and deductible on borrowing, resulting in an increase in the tax burden on lenders and a decrease in the tax burden on borrowers, when inflation leads to high nominal interest rates.

The ideal personal income tax would have a broad base of income and a large basic allowance to eliminate low-income households from the tax rolls and to ensure a degree of progressivity in the tax code. The broader the base of the tax, the lower the rates that are

needed to raise any given amount of revenue. Most income tax would be collected through withholding, minimizing the number of taxpayers who would have to file tax returns. In practice, most tax systems fall far short of defining income comprehensively and then fall short again in allowing overly generous deductions, exemptions, and credits. Comprehensive income taxation is an elusive goal.

The Choice of Taxable Unit

JANET STOTSKY

- *Why is the choice of taxable unit important in the design of a personal income tax?*
- *What do we mean by a "marriage tax"?*
- *What are the advantages and disadvantages of joint versus individual filing?*
- *What are common practices?*

There are several different ways in which the taxable unit may be defined in a personal income tax system. First, each individual may be taxed separately, regardless of marital status. Second, couples may be taxed on their joint income. Third, couples may have the option of being taxed jointly or separately. Finally, families may be taxed on their joint income. Determining the taxable unit is not as obvious as it might appear at the outset. This section will address the considerations appropriate for the selection of the taxable unit and their various ramifications.²²

Interaction of the Taxable Unit and Other Features of the Tax System

There are, in principle, four different features of a personal income tax system that determine tax liability: first, the choice of taxable unit; second, sources of income subject to tax; third, tax preferences, such as allowances and credits; and fourth, the tax schedule. Tax systems may combine these factors in many different ways to achieve specific objectives. The choice of taxable unit, along with these other critical features of a tax system, thus has important equity, efficiency, and administrative implications.

It is possible to illustrate the interactions among the different features of a tax system with a simple, hypo-

²²See Bradford (1984), Brazer (1980), and Munnell (1980).

thetical tax system. Assume the following tax schedule: no tax on income up to \$5,000, a 10 percent tax on income from \$5,001 to \$30,000, and a 20 percent tax on income above \$30,000. Assume two hypothetical married couples, A and B and C and D. Table IV.1 gives their taxes under different definitions of the taxable unit. Under individual taxation, column 2 presents their incomes and column 3, their tax liability; under joint taxation, column 4 presents their joint income and column 5, their tax liability.

Table IV.1. Choice of Taxable Unit—Hypothetical Tax System
(In U.S. dollars)

	Individual		Joint		Income Splitting	
	Income	Tax	Income	Tax	Income	Tax
A	200,000	36,500			100,000	16,500
			200,000	36,500		
B	0	0			100,000	16,500
C	140,000	24,500			100,000	16,500
			200,000	36,500		
D	60,000	8,500			100,000	16,500

Source: IMF staff calculations.

As Table IV.1 indicates, A and B pay the same total tax regardless of the choice of taxable unit because A is the only earner of income in the family. C and D, in contrast, under individual taxation, pay a total of \$33,000 in tax, and under joint taxation, pay a total of \$36,500 in tax. This increase in tax burden under a system of joint taxation with increasing marginal tax rates is often termed a "marriage tax." As a result, tax systems often include provisions to provide relief from this additional tax. One method, known as income splitting, effectively taxes each spouse as an individual on one-half of the couple's total income, generally by applying the individual schedule to the couple's total earnings but doubling any standard deduction and the width of the tax brackets. In the example, with income splitting, A and B would each pay tax on \$100,000 of income, reducing their combined tax bill to \$33,000. C and D could likewise reduce their combined tax burden to \$33,000, thereby eliminating the "marriage tax." A, in fact, gets a "marriage benefit" because he lowers his tax burden by getting married. In some systems with joint taxation, income splitting is not permitted. Instead, different schedules may apply to couples filing jointly; or, couples may be allowed to file separately for which another schedule applies. In this case, depending on the variation in schedules and other tax preferences as well as the distribution of earnings between spouses, there may be a "marriage tax" for some and a "marriage benefit" for others. In an

individual taxation system with increasing marginal tax rates, the nature of the problem is somewhat different. The tax system is neutral with respect to marriage in that when two individuals get married, their tax burden does not change. When considered as a unit, however, married couples with equal incomes will generally pay different taxes. Also, a couple will pay different amounts of tax than an individual with the same total income. For instance, in the case of equal total incomes, if there is only one earner in each couple, then the tax burden is identical for the two couples and for the individual. If both spouses earn income, however, then their tax burden will be less than that paid by a couple with one earner or by an individual.

Under a system of individual taxation, marriage relief can be seen as equalizing the tax burden on two couples who have the same total income but have a different distribution of earnings between the spouses. In this case, this relief does not take the form of income splitting or different schedules but rather tax preferences, such as credits, which may be transferable between spouses. For instance, the husband may get a tax credit which, if he does not wish to claim, can be transferred to the wife as a credit on her return. This tax relief is most important for low-income married households for whom any tax preferences will represent a larger share of their tax burden. With respect to the issue of equity between a couple and an individual with the same income, it is sometimes argued that to the extent that the tax system should correct for ability to pay, it is fair for a couple with the same income as an individual to pay less in tax because the couple has a higher cost of living. Marriage relief is thus a correction for differences in ability to pay.

Equity

The choice of taxable unit thus has important equity implications, particularly with respect to considerations of horizontal equity. The basic notion of horizontal equity is that those with equal income should pay equal taxes. As the discussion illustrates, it is by no means clear to which definition of the taxable unit this criterion for equity should apply, since under every tax system except a very simple one, the criterion will mean something different depending on the choice of taxable unit. Should individuals with equal income pay equal tax or should couples with equal income pay equal tax or should individuals and couples with equal income pay equal tax? The answer is not obvious. If ability to pay (for which income is generally the proxy) depends on household income rather

than the income of any one individual in the household, then it might be more appropriate to base the measure of horizontal equity on the household. Marriage is, however, only one, readily identifiable means of creating a household. Households may comprise one individual or many, legally unrelated individuals as well, with varying degrees of sharing of household resources. Defining the household unit as one based on marriage is thus somewhat arbitrary. Thus, the individual may ultimately be a more appropriate measure of ability to pay on which to base judgments of horizontal equity.

Society's values thus influence the choice of the most equitable taxable unit. To the extent that a married couple has typically been regarded as the standard household unit, this provides justification for taxing the couple as a unit. Today, however, in western societies, a much greater number of individuals are living alone or in a variety of household arrangements, including reconstituted families and unmarried individuals living together, and in more traditional societies, atomistic families are still not the vogue and large extended households—often inclusive of grandparents and cousins—tend to predominate. Under these circumstances, justification for taxing the traditional married couple as a unit may not be as persuasive.

Efficiency

The choice of taxable unit also has important implications for efficiency since it has an effect on the marginal tax rate of the unit and thus has an effect on decisions to work, save, and invest, and on the composition of the household. The importance of these efficiency effects depends both on the degree to which the tax system alters the incentives that individuals face and the responsiveness of their behavior to changes in the tax rate and other features of the tax system. Considerable effort has gone into investigating the effects of changes in taxes on behavior.²³ Evidence from both industrialized and developing countries suggests that changes in the marginal tax rate as well as other features of the tax system alter labor supply decisions, and savings and investment behavior.²⁴

To illustrate how the choice of taxable unit affects the marginal tax rate, suppose that under the hypothetical tax system given earlier, A and B decide to get married and file jointly. B goes from the position of facing a marginal tax rate on income of 0 percent to

20 percent (since the marginal tax rate applies to the last dollar earned of the couple, it applies to dollars in excess of A's income). Economic theory would suggest that the increase in B's marginal tax rate might discourage her from working, thus causing inefficiency. As another example, suppose that B had \$2,000 of capital income. If she got married and filed jointly, she would face an increase in marginal tax rate on this income, which might alter her investment behavior.

Other Issues Affected by the Choice of Taxable Unit

Nonlabor income poses a problem in that there is no ideal way to treat it in a system of individual taxation. The original British practice of attributing all of the nonlabor income to the husband is outdated. Another approach, which attributes all of the income to the higher earner is unappealing in that a taxpayer may be taxed on income over which he or she has no control. Another approach, which allocates the income equally between spouses, suffers from the same problem. A final possibility is to allow couples to allocate the income however they like, but this can lead to tax avoidance through shifting of income to the lower-earning spouse. This treatment of nonlabor income imparts a scheduler aspect to the taxation of personal incomes. Similar problems arise in the treatment of income from unincorporated businesses and closely held corporations because it must be allocated between spouses.

Treatment of nonlabor earnings of dependents further complicates this issue. A common tax avoidance scheme has been to transfer nonlabor income to children, to reduce the tax on this income. It might thus be desirable to require that nonlabor income be taxable to the parents, if they file jointly, or to one of the parents, if they file separately, and not allow it to be attributed to dependents. It would probably make sense to tax labor income on the basis of the earner, as this is less subject to tax abuse, and to require dependents to file their own tax return, if their labor earnings are above some threshold.

Itemized deductions that are linked to some measure of income also pose a problem. In some countries, certain expenses, such as medical, are itemizable deductions only on the amount that exceeds a given percentage of income. By combining two taxpayers, the sum of the expense may not, however, change income increases, thus reducing the likelihood that this expense can be itemized.

²³See Gandhi, et al. (1987) and Auerbach and Feldstein (1985).

²⁴See Hausman (1985), Sandmo (1985), and Ebrill (1987).

Choice Between Individual and Joint Filing

Taking all of these arguments into consideration, there are several arguments in favor of requiring individual filing. First, it eliminates the marriage "tax" and "benefit" based on the progressivity of marginal tax rates. Second, it imposes no value judgment on what constitutes the standard filing unit. Thus, marginal tax rates and overall burdens are neutral with respect to marriage and other household forms. On the other hand, there are several arguments in favor of allowing joint filing. First, it gives the tax code another way of adjusting the tax burden to account for differences in ability to pay based on household composition. Second, it eases administrative complications connected with the allocation of nonlabor income and the treatment of dependents. Although, a system of individual filing can also deal with these issues.

Practices in OECD Countries

Within the Organization for Economic Cooperation and Development (OECD) countries, in recent years, the trend has been away from joint taxation and toward individual taxation. Fifteen countries use the individual as the unit of taxation (although four of these countries use different methods for taxing nonlabor income and labor income), four countries use joint taxation, and five countries give married taxpayers a choice between joint and individual taxation. Table IV.2 provides a summary of major characteristics of OECD personal income tax systems.²⁵ The countries are grouped in the table according to the manner of labor income taxation. Column 2 indicates the major changes since 1970 in the treatment of the taxable unit. From 1970 to the present, ten countries have switched from joint to individual taxation, while three others have modified the allowable form of taxable unit.

Column 3 indicates the nature of relief for marriage. Only four countries have no tax relief for marriage. Seven countries provide relief through credits, five countries through allowances or deductions, and eight countries through income splitting or different tax schedules. As an example of tax relief through a credit, the Australian tax system allows a married taxpayer to claim an additional tax credit if he or she contributes to the maintenance of a dependent spouse. This credit diminishes in value by \$1 for every \$4 by which the spouse's income exceeds a fixed amount. Thus, if the dependent spouse's income is A\$100 over the threshold, the credit is reduced by A\$25, increasing the mar-

ginal tax rate by 25 percent in the phase-out range. As an example of tax relief through a deduction, the Japanese tax system allows a married taxpayer who lives with a spouse to claim an additional deduction. The level of the deduction depends upon the spouse's income. As an example of tax relief through different tax schedules, the U.S. system allows couples to choose whether to file jointly or separately.²⁶ The schedule for individuals has a smaller standard deduction and lower thresholds for applying higher marginal tax rates than the schedule for married couples filing jointly. Married couples filing separately, however, face a schedule which has a smaller standard deduction (income that is subtracted from gross income to arrive at taxable income for all taxpayers) and lower thresholds than the standard individual schedule. Thus, filing separately is seldom advantageous on tax grounds.

Column 4 indicates the nature of reduction in marriage relief if the spouse is gainfully employed. In eight countries, this relief is reduced if the spouse is employed or if his or her income exceeds a fixed amount, as in the examples of Australia and Japan, cited earlier. Column 5 indicates the degree to which spouses can transfer unused credits or allowances between themselves. In nine countries, unused credits or allowances may be transferred between spouses. For instance, in Iceland, the taxation is based on the individual and each taxpayer is entitled to a basic tax credit. If one spouse does not fully use the tax credit, he or she can transfer up to 80 percent of the unused credit to the spouse.

Column 6 indicates the treatment of nonlabor income. In general, nonlabor income is treated as labor income. Four countries using individual taxation, however, provide a different treatment for nonlabor income. Two countries tax nonlabor income according to the spouse with the highest labor income, and in two other countries, the income is taxed jointly. In one of these countries, the tax is divided between spouses according to their respective share of total nonlabor income. For instance, in the Netherlands, nonlabor income is taxed in the hands of the spouse with the higher labor income.

Informal unions outside of marriage pose another set of problems. Six countries have provisions that apply to informal unions between members of different sexes allowing them to be treated the same as married couples, where joint residence is the basic test for an informal union. Two countries have provisions for

²⁵This table is taken with slight modification from *The Tax/Benefit Position of Production Workers*, Organization for Economic Cooperation and Development, Paris (1991b), pp. 267-68.

²⁶The U.S. tax system has four schedules: for married filing jointly, married filing separately, individuals, and single heads of households with legal dependents.

Table IV.2. Tax Units Under the Personal Income Tax in OECD Countries—Structural Measures, 1990

Country	Changes since 1970	Relief for Marriage	Reduction in Marriage Relief if Spouse Gainfully Employed	Transferability of Unused Allowances or Credit Between Spouses	Treatment of Nonlabor Income
<i>Individual Taxation¹</i>					
Australia	—	Credit	Credit tapers off as spouse's income exceeds fixed amount	Yes ²	Separate
Austria	From joint in 1973	Credit	Yes	No	Separate
Belgium	From joint in 1989 for earned income	Both spouses receive married couple's allowance	No	Yes	Aggregate
Canada	—	Credit	Credit is reduced if spouse's net income exceeds fixed amount	Yes	Separate
Denmark	From joint in 1970	No relief	Not applicable	Yes	Aggregate; however, the tax is divided between spouses according to his or her share of total capital income
Finland	From joint in 1976	No relief	Not applicable	No	Separate
Greece	—	Allowance	No	Yes	Separate
Iceland	From joint in 1980	Credit	Yes	Yes	Total of unearned income added to income of spouse with highest earnings
Italy	From joint in 1977	Credit	Yes, provided the spouse's income does not exceed Lit 4,500,000	No	Separate
Japan	—	Allowance	Yes	No	Separate
Netherlands	From joint in 1973	Allowance	Yes	Yes	Taxes attributed to the spouse with the highest labor income
New Zealand	From joint in 1971	No relief	Not applicable	No	Separate
Sweden	From joint in 1971	Credit	Yes	No	Separate
Turkey ³	—	No relief	Not applicable	No	Separate
United Kingdom	From joint to optional in 1972 and to individual in 1990	Husband can only receive married couple's allowance if he and his wife are legally married	No	Yes ⁴	Separate
<i>Joint or Family Taxation¹</i>					
France	—	Income splitting	No	No	Aggregate
Luxembourg	—	Income splitting	No	No	Aggregate

Portugal	From a mixture of family and individual to family in 1989	Income splitting	No	No	Aggregate
Switzerland ⁵	—	Different schedules	No	No	Aggregate
<i>Optional Taxation¹</i>					
Germany	—	Income splitting	No	No	Aggregate
Ireland	To income splitting in 1980	Income splitting with option for joint	No	Yes	Aggregate
Norway	—	Different schedules	No	No	Aggregate
Spain	From joint in 1989 ⁶	Credit	No	No	Separate or aggregate
United States	—	Different schedules	No	No	Separate or aggregate

Source: *The Tax/Benefit Position of Production Workers*, Organization for Economic Cooperation and Development, Paris (1991b), pp. 267–68 with slight changes.

¹Countries are classified according to the taxation of labor income.

²Holds only for unused portion of the pensioner's rebate.

³Joint above a ceiling.

⁴Holds only for unused portion of the married couple's allowance.

⁵At federal level; varies at cantonal level.

⁶Applicable to 1988 income.

informal unions between members of the same sex. No doubt, countries that use the joint method of taxation will face more problems with this issue in the future if these unions become more socially acceptable.

Selected Practices in Developing Countries

The choice of taxable unit varies across developing countries, although the majority of countries use individual taxation. Any schedular income tax system must rely on the individual as the filing unit. In Latin America, Argentina and Mexico use individual filing, while Brazil and Venezuela use joint filing but permit individual filing under certain conditions. In Asia, the same range of practices is found, although most countries rely on individual taxation. China, India, Indonesia, Iran, Japan, Korea, and Pakistan all use individual filing, while Taiwan uses a hybrid individual-joint filing system. Africa, Egypt, Nigeria, and South Africa use individual filing, while Kenya uses joint filing.

Conclusion

The choice of taxable unit is a complicated and difficult one for a personal income tax system. The ultimate decision involves certain judgments with respect to the equity, efficiency, and administration of the tax code. Tax systems based on individual taxation have certain virtues in that they are neutral with respect to marital status and avoid the efficiency problems that result from joint taxation. They do, however, result in different treatment of married couples with the same income, de-

pending on the distribution of earnings between spouses. On the other hand, tax systems that are based on joint taxation while achieving equal treatment of married couples with the same income, regardless of the distribution of earnings between the spouses, create inequalities in taxation between married and unmarried couples and individuals with the same income.

The Progressivity of Personal Income Tax Systems

JOHN NORREGAARD

- *What is progressivity of a personal income tax system and why is it important to be able to measure it?*
- *Which factors determine the level of progressivity in a given system?*
- *How can progressivity in practice be measured?*

It is well known that a poll tax is the least distortive tax available since it does not interfere with the saving and consumption behavior of individuals. Because of its unacceptable distributional characteristics, however, it has not been successfully applied in any country. It is safe to state that in all market economies, there is broad public support for some redistribution via public finances. The main instruments used to achieve distri-

butional objectives are provision of free public goods and income transfers between different groups of the population, combined with the use of progressive personal income taxes.

Taxes other than the personal income tax also have important redistributive implications, particularly payroll taxes, property taxes, and consumption taxes. This section deals with three important aspects of personal income tax progressivity: how progressivity can be defined; what determines the level of progressivity in a given tax system; and how the actual level of progressivity can be empirically measured. The issue of equity and fairness is dealt with in more detail in Chapter II.

The need for measures that reflect the level of progressivity, described in more detail below, follows from the redistributive impact of income taxes being determined by a number of factors of a widely different nature. Thus, one cannot simply ascertain the level of progressivity by looking at the statutory tax schedule: in most of the tax reforms which have been implemented in recent years, nominal marginal rates have been reduced, but concurrently, tax bases have been broadened by bringing untaxed income sources within the tax net. Evaluation of the total impact of such changes on the global level of progressivity requires measures of a nature described below.

What Is Progressivity?

Income tax progressivity is normally associated with the notion of a tax schedule with an increasing rate. Progressivity may be formally defined as follows: let $T(Y)$ represent total income tax liabilities of an individual with income Y , let $m(Y)$ represent the marginal tax rate, and $t(Y)$ represent the average tax rate. An income tax could then be defined as progressive when the elasticity of the tax with respect to income exceeds unity for all income levels, and regressive if the elasticity is below unity. A proportional income tax would have a unitary elasticity. In other words, progressivity implies:

$$(dT/T)/(dY/Y) > 1, \text{ or:}$$

$$m(Y)/t(Y) > 1 \Leftrightarrow m(Y) - t(Y) > 0$$

This is equivalent to saying that a tax system is progressive if the marginal tax rate exceeds the average tax rate, or if the average tax rate is an increasing function of income, which is the same thing. Note first that the above relates to progression at a given point in the income scale, and therefore does not provide an unambiguous index of overall progressivity. As described in more detail in a subsequent section, different concepts

have been established which measure different aspects of overall progressivity. Second, note that the requirement that the marginal tax rate exceeds the average tax rate may be satisfied in some cases which normally would not be considered to reflect a progressive tax system. As an example, consider a tax system, which is characterized by the following nominal tax rate schedule that applies to—say—income intervals of 10 units: 0 percent, 15 percent, 20 percent, and 30 percent. Above the zero-rated first bracket, the requirement that $m(Y) > t(Y)$ is satisfied for all Y , although this system could not be perceived as a purely progressive one. For this reason, one may want to add the requirement that the second order derivative of the tax function be positive, that is, that the marginal tax rate should also be a positive function of income.²⁷

Determinants of Progressivity

Assuming that a comprehensive (Haig-Simons) measure of gross income can be agreed upon as the relevant income measure against which to measure progressivity,²⁸ the following four basic determinants of progressivity can be identified.

Choice of tax unit: Dependent upon whether individual or family taxation has been chosen, the ratio of marginal to average tax rates may differ for spouses with a given aggregate level of income (see preceding section).

Sources of income subject to tax: It is well known that the composition of personal income changes as one moves up in the income distribution. Generally, the role of personal capital income (i.e., interest income, dividends, and capital gains) increases with increasing levels of income. To some extent, the same applies for retirement income. This has the important implication that the level of overall progressivity (defined in more detail in the following section) depends greatly upon the extent to which different income sources are included in the tax base of a global income tax, or are exempt or subject to flat rate schedular taxation.

It is common to find that at least some sources of capital income are taxed differently from wage and salary income. Interest income in general or some spe-

²⁷In practice, however, many tax systems have special phase-out rules that raise marginal tax rates over a specific income range, although these systems would still be considered progressive.

²⁸Actual experience with regard to this issue in OECD countries shows that this is not a simple task. For example, some countries would argue that mortgage interest expenses should be deducted to arrive at the relevant income measure, thus in most cases making the tax system look more progressive, whereas other countries take the opposite standpoint.

cific types of interest income may not be taxed at all, or are subject to a (relatively low) flat withholding rate. Similarly, capital gains may, wholly or partly, be exempt or subject to fairly modest tax rates at the personal level. Depending on the integration system in function, dividends may be taxed differently from other personal income sources. Although many countries have moved toward more global income tax systems, none has so far introduced truly global systems with identical treatment of all components of personal income. This is true for both developed and developing countries.

To the extent that especially capital income sources are excluded from the personal income tax base, or are taxed at lower flat rates, a seemingly progressive nominal tax schedule may translate into a substantially more modest overall or real level of progressivity, taking into account all personal income sources.

Tax allowances and credits: The provision of tax allowances and thus the way taxable income is defined may substantially affect overall progressivity. By allowing, for example, full deductibility for all interest expenses, which normally increases as a proportion of income when income rises, the level of overall progressivity may, *ceteris paribus*, be reduced compared to a system with more modest or no interest deductibility (even taking into account that interest deductibility to some extent will be "capitalized" in the interest rate).

A special issue is the choice between tax allowances, which are deducted from gross income to arrive at taxable income, and tax credits, which are deducted from gross tax liability to arrive at final tax liability. Some OECD countries have moved from the use of tax allowances, which in combination with a progressive tax schedule benefits high incomes more than low incomes, to tax credit systems, which can be designed so that the "tax value" of the relief is the same for all taxpayers, independently of the level of income. Tax relief resulting from an allowance of a given size equals the allowance multiplied by the *marginal* tax rate confronting the taxpayer. Thus, under a progressive tax, the amount of the relief will invariably increase with income. On the other hand, a tax credit may, for example, be calculated as a specific amount per taxpayer, that is, independent of the level of income.

The tax schedule: Whereas the large majority of countries apply tax schedules under the personal income tax with increasing marginal nominal tax rates, it is striking how different are the ways in which this is achieved.²⁹ Some countries have chosen bracket sys-

tems with very elaborate "progressivity" as reflected in a substantial number of brackets and corresponding rates. Other countries have chosen systems with very few brackets and rates, in some cases with fairly wide first brackets, emphasizing administrative simplicity and the need to make to the extent possible tax withheld equal to final tax paid. Developing country tax reforms in the 1980s have generally proceeded in this direction.

An "overlapping" issue between the choice of tax schedule and tax allowances is the question of the size of the *tax threshold*, which is that level of (gross) income at which tax is first paid. A given level of the tax threshold, which may in itself substantially affect the level of overall progressivity, can be achieved by different means: by a basic tax allowance applying to all taxpayers; by a similar tax credit; or by zero-rating income up to a certain level. Again, it is characteristic that different countries have chosen different solutions.

Measures of Progressivity

The issue of how to measure progressivity in a given tax system has been intensively discussed in the literature during the last decade or so. There is universal agreement that no "correct" measure exists, and that—following Kiefer³⁰—existing measures may broadly be classified into two groups: structural indices and distributional indices. *Structural indices* are generally based on calculations of tax liability at selected levels of income, for example average income, or fixed multiples of a single reference income. The purpose is to illuminate important aspects of the tax system in question with regard to tax liabilities at different income levels. They differ from *distributional indices*, which depend upon information about the entire distribution of income.³¹ Distributional indices may again be classified according to the measure of inequality upon which they are based. Since most distributional indices are based on the well-known concept of the concentration index—or the Gini coefficient—which again is based on the Lorenz or concentration curve, the following brief summary focuses mainly on these measures.

The importance of the inequality measure used follows from the close relationship between inequality and progressivity: if the average tax elasticity exceeds unity, posttax income will be more equally distributed than pretax income. Since the level of progressivity is reflected in this *change* in income inequality between the before- and after-tax situation, measures of pro-

²⁹See OECD (1990), for example, for a variety of rate structures.

³⁰See Kiefer (1984).

³¹See Kiefer (1984) and Norregaard (1990) for an overview.

gressivity must, either explicitly or implicitly, be based on some measure of inequality. The Lorenz or concentration curve, on which the Gini coefficient is based, is defined as the relationship between the cumulative proportion of income and the cumulative proportion of income-receiving units. The Gini coefficient may in turn be defined as one minus the ratio of the area under the Lorenz curve to the area under the diagonal or the egalitarian line as shown in Figure II.3.

These measures of progressivity may also be divided between "tax-scale invariant" and "redistribution" indices. This distinction actually captures an important aspect of the measures that has been at the center of the significant controversy over the measurement of progressivity in the last decade. The distinction may perhaps best be explained by exemplifying each of the two different types of measures.

Musgrave and Thin developed a progressivity index M which they called "effective progression,"³² based upon a comparison of the Gini coefficients for income before tax (G_b) and after tax (G_a):

$$M = (1 - G_a)/(1 - G_b).$$

This is an indicator of the relative equality of the before- and after-tax distribution: values greater than 1 indicate a progressive tax.

Kakwani³³ developed a progressivity index K based on a comparison of G_b and G_t , where G_t is equal to the Gini coefficient of taxes, calculated on the basis of a Lorenz curve showing the cumulative proportion of taxes against the cumulative proportion of income receiving units (using pretax income as the classifier). The measure is defined as:

$$K = G_t - G_b.$$

According to this measure, a tax is judged to be progressive if the tax is more unequally distributed among taxpayers than is pretax income, thus resulting in a tax concentration curve which is more concave than the Lorenz curve (i.e., K is greater than zero).

The last decade has seen a proliferation of this kind of Gini-based measures, most of which fall within the two broad groups mentioned above. The basic difference between the two indices M and K may be explained as follows: imagine a tax system which is extremely "progressive" in the sense that all taxes fall on the richest decile of taxpayers, but with a modest total tax burden equal to, say, 1 percent of GDP. This system will generate a large value of K because the

Lorenz curve for taxes will be very concave, but because of the low total tax burden, the system will hardly affect the after-tax distribution of income, and will thus simultaneously generate a low value of M . In other words, taxes looked at in isolation are very unevenly distributed among taxpayers, and thus in this sense very "progressive," but because the total amount of taxes is so modest, they do not "move" the income distribution very much.

Alternatively, imagine a tax system where the tax burden is much more evenly distributed across deciles (although still being clearly "progressive"), but with a "Scandinavian" level of tax burden equal to about 50 percent of GDP. This system will generate a relatively large value of M because pretax and posttax distributions of income will be markedly different (taxes "move a lot of income"), but on the other hand, a relatively low value of K because of the Gini coefficient of taxes is not that different from the Gini coefficient of pretax income.

The above examples show that the measures in question illuminate two different aspects of progressivity: tax-scale invariant measures do not yield different progressivity measures when the tax paid changes with the same multiple at each income level; they depend upon the distribution of tax. Redistribution measures are invariant when the after-tax income changes by the same multiple at each income level and depend upon the distribution of after-tax income. The difference is important because alternative measures do not always give consistent rankings of different tax systems with respect to the level of progressivity. This is an argument for using several different measures, as many empirical analyses actually do.

As shown by Kakwani (1976), however, there is a formal link between the two classes of measures, as reflected in the following equation:

$$G_a - G_b = tK/(1-t).$$

where t is the average tax rate. For a given value of K , the change in inequality brought about by the tax system is an increasing function of t . If t is small, a tax system may be judged highly progressive according to the index K , but at the same time be approximately proportional according to the group of redistributive measures. Depending on which aspects of progressivity they consider most important, different authors advocate different measures.

The Gini-based progressivity measures dealt with here have, however, been criticized on the basis that, underlying any summary statistic of the level of progressivity, there is some concept of social welfare, and

³²See Musgrave and Thin (1948).

³³See Kakwani (1976).

ideally the analysis should explicitly recognize and focus on the welfare function in question.³⁴ In this vein, indices of inequality, such as the Gini coefficient, can be thought of as assigning weights to income transfers from richer to poorer individuals. Thus, the Gini coefficient has been criticized on the basis of first, its attaching most weight to income transfers among individuals close to the mode of the income distribution, and sec-

³⁴See, for example, Atkinson (1970).

ond, its possessing the same symmetric weighting scheme regardless of how equal or unequal the income distribution in question is. A more satisfactory system would be one in which transfers to the poor probably would be assigned a greater weight, the larger the initial inequality is. Nevertheless, the kind of measures discussed here have to be recognized for their simplicity which perhaps explains their much wider use compared to the more complicated alternatives available.

Corporate Income Tax

The Concepts of Business Income and Taxable Income

JOHN R. KING

- *What are the main issues that need to be determined in measuring the income of a business in its accounts? In what areas do the principal problems arise in practice?*
- *In the area of business income measurement, how are tax laws related to accounting practice?*

Measuring Business Income in Company Accounts

Business accounting systems in market economies are constructed around two principal summary statements of the financial position of a business. The first is a balance sheet which shows its assets and liabilities at a given point in time, usually the end of the accounting period. The second is an income statement (or "profit and loss account") which shows its revenues and expenditures for a particular period of time, between two balance sheet dates.

The balance sheet may classify assets and liabilities in a variety of ways, but a fundamental distinction that is usually drawn is that between "monetary" assets and liabilities whose value is fixed in nominal terms (such as cash, accounts receivable and payable, and borrowing), and "nonmonetary" assets such as land and buildings, plant and equipment, inventories, and investments in subsidiaries or the shares of other companies. The net worth of the business is the difference between the balance sheet value of its assets and of its liabilities. Double-entry principles ensure that changes in the net worth of the business between two balance sheet dates are equal to the amount of profit earned in that period, as shown in the profit and loss account—except insofar as profits are distributed to shareholders.

In constructing such accounting systems, two fundamental issues that arise concern the timing of recognition of revenues and expenditures in the income statement, and the principles governing the valuation of assets in the balance sheet.

Timing

Except in the case of very small businesses, income is generally measured on an "accruals" basis. Sales revenues are recorded when goods are supplied (or an invoice is issued), rather than at the time the corresponding cash payment is received. Expenses attributed to a particular period consist of assets used up in obtaining the revenues of that period. Capital expenditures are thus spread over the number of periods that each capital asset is used to generate revenues.

Valuation

Accounting systems value assets (and liabilities), for a balance sheet, in different ways. Because of the close relationship between the balance sheet of the business and its income statement, different choices of valuation basis may have important implications for the measurement of income attributable to the owners of the business. For most capital assets, the major practical alternatives are original cost and market value (measured on a disposal or replacement cost basis).

A strong case can be made that, in principle, it would be appropriate to value assets in business accounts on the basis of their opportunity cost or "value to the owner."³⁵ A profit-maximizing firm would sell a particular asset that it owns if the disposal proceeds were greater than the discounted present value of expected net earnings from using the asset in production. The higher of those two amounts may be referred to as the "economic value" of the asset to the firm. In most cases, however, this will not be the asset's opportunity cost. If the firm were to be deprived of the asset, and it could be replaced for less than its economic value, then the profit-maximizing firm would replace it; the loss suffered by the firm would thus be limited to the asset's replacement cost. Hence, "value to the owner" principles imply that assets should be valued at the *lower* of their replacement cost and economic value—where economic value is defined as the *higher* of net realizable value on disposal, and the discounted present value of future net earnings from the asset.

In practice, however, accounting systems value most assets on the basis of their original historical cost—after adjusting, where appropriate, for past depreciation

³⁵See Edwards, Kay, and Mayer (1987).

(amortization) that has been charged to the profit and loss account. (In Latin America, some accounting systems also adjust the original historical cost in accordance with changes in the general price level since the date the asset was acquired.) The main justification for this choice is that historical cost typically provides a more objective standard than other valuation bases such as replacement cost or value to the owner.

When assets are valued at historical cost, no capital gain or loss will be recorded in the income statement unless and until an asset is disposed of and the gain is "realized" and recognized. With valuation at current market prices, however, such gains or losses need to be brought into the accounts in each period—either by means of an entry in the income statement, or by a change to a "capital reserve" liability in the balance sheet.

Problem Areas in Business Income Measurement

Most of the major practical problems that arise in measuring the income of a business in a particular accounting period concern the capital assets and liabilities of the business. This section summarizes some of these difficulties, which are considered in more detail in later sections.

Depreciation

As noted above, accounting systems allocate the costs of capital assets over time—in principle, according to the extent to which those assets are "used up" in generating revenues. This concept of the cost of a capital item in a particular period cannot usually be measured straightforwardly, however. Accordingly, conventional rules of thumb are applied to derive an estimate of the depreciation of capital assets; for example, the (original) cost of the asset may be allocated evenly over its expected useful life.

Inventories valuation

In the case of inventories, when large numbers of assets of a particular type are held at any point in time but the actual acquisition and disposal dates of particular items cannot be separately identified, valuation at cost requires that assumptions be made about the pattern of acquisition and disposal. The main alternatives adopted by accounting systems as conventional assumptions, in practice, are "first in, first out" (FIFO) and "last in, first out" (LIFO). Valuation at cost, on a FIFO basis, will approximate valuation at current market values. LIFO valuation will result in lower values when inventories' prices are rising over time; it will also result in lower *increases* in inventories' values, at

least when the volume of inventories held by the business is constant or increasing over time.

Intangible assets and "goodwill"

Expenditures by a business on advertising or research and product development create assets that generate revenues in the future. Accordingly, such expenditures should, in principle, be capitalized and written off (in the same way as fixed capital expenditures) over those future periods, rather than treated as costs in the current period. Estimating an appropriate depreciation charge for intangibles produced by the business itself is, however, particularly uncertain, and accounting systems differ widely in their treatment of these expenditures. Similarly, there are wide differences in the treatment of "goodwill," which is the difference between what a business pays when it acquires another business as a going concern and the book value of the assets of the business that is acquired.

Exchange rate changes

When a business has assets in a foreign country (such as a foreign branch operation), or an asset or liability which is denominated in a foreign currency, exchange rate changes may have implications both for its balance sheet and for its income statement. The appropriate method of accounting for these changes has, however, been a matter of controversy in several countries; the accounting practices that have been adopted vary. Two main issues arise. The first is whether the particular asset or liability should be valued in domestic currency terms in the balance sheet of the business at its original cost, or at current market value (i.e., using the current exchange rate). If market value is chosen, the second issue is whether gains and losses arising from exchange rate changes should be included along with other revenues or expenditures in the income statement, or taken instead to a capital reserve in the balance sheet.

Domestic price level changes

The most difficult and controversial problems of business income accounting arise under conditions of inflation, which may distort the measurement of income in several areas. Depreciation based on historical cost will understate the true cost of assets to the business in the current period. Increases in the book value of inventories, particularly when measured on FIFO assumptions, will overstate the increased value of these assets that is properly included in the income of the business. Similarly, capital gains recorded in the accounts—on either a realization or an accrual basis—will overstate the true gains of the business. On the other hand, the accounts will not show as income, as

they should, the capital gain that accrues to the business as a result of the fall in value of net liabilities that are fixed in nominal terms—that is, its net “monetary” liabilities, primarily debt.

The extent of these distortions depends, of course, on the valuation conventions that are adopted in the accounts. For example, if depreciation is based on asset values measured at current replacement cost, the amount shown in the accounts will be largely unaffected by inflation, except for relative price changes.

Tax Laws and Accounting Practice

Income tax laws do not usually seek to define “income” comprehensively, either in general terms or in detail. Most practical issues of business income measurement for tax purposes are left to be determined by “generally accepted accounting practice,” which may be governed by a separate accounting law (or other legislation such as a Companies Act), and which is sometimes codified in national standards of accounting practice. The relationship between tax laws and accounting practice varies. In some countries (such as Germany), the published accounts of enterprises must conform to specific provisions in the tax law. More commonly, specific provisions in the income tax law, or associated regulations, *override* practices which may be adopted in published accounts, in certain areas, in determining the tax liabilities of a business.

Almost all income tax laws specify the depreciation rates that must be applied in the case of particular assets. They also normally specify certain costs which are not allowable as deductions for tax purposes. Such costs commonly include, among other things, certain “provisions” that may be made in the accounts (such as a general provision for bad debts); payments of certain other taxes (together with fines and penalties for late tax payment); and certain expenditures which the government may wish to discourage (such as business entertainment), or which are not incurred “wholly and exclusively” for business purposes. In addition, income tax laws generally restrict the valuation conventions that may be employed in measuring the income of a business. LIFO valuation of inventories, for example, is not allowed for tax purposes in many countries. In general, the main purpose of these specific provisions in income tax laws is to make the measure of income for tax purposes more objective than it may sometimes be in commercial accounts that are drawn up to serve other purposes.

Finally, income tax laws must provide for specific deductions that are not necessary in the commercial

accounts of a business, such as any deduction for losses brought forward from earlier years.

Depreciation Schedules

DALE CHUA

- *What are the main types of depreciation schedules?*
- *What are pooled asset accounts?*
- *Some examples of tax depreciation and economic depreciation rates.*

An ideal tax depreciation schedule for an asset is one that is designed to provide as closely as possible a tax deduction profile over time that mimics the profile of the asset's true economic depreciation. The depreciation expenses or capital cost allowance charged against revenue should represent, if possible, the real decline in value of the depreciating asset. Any departure from this rule will imply that the taxable profits of the firm will also deviate from the ideal tax base. In other words, the taxable profits of a firm will be either over- or understated in real terms when deductible tax depreciation deviates from the true economic depreciation of an asset.

Depreciation charges for an asset account for the loss in value from wear and tear, economic obsolescence and/or the change in monetary value of the asset over time. In general, an asset must have a useful life of more than one year to qualify for a depreciation deduction. This implies that virtually all machinery, vehicles, equipment, plants, and buildings will qualify. Land, on the other hand, is not depreciable because it has an infinite useful life for most purposes.

Given that it is administratively impossible to monitor and impractical to design a depreciation system that will track over time the real economic depreciation charges for each asset group to allow the real yearly decline in each asset value to be written off as revenue, a set of arbitrary rules is generally applied. These rules or depreciation schedules become applicable when an asset is acquired, and are consistently applied to the asset in subsequent years until it is retired or sold. In what follows, we discuss two commonly adopted depreciation rules.

The Straight-Line Method

Under the straight-line method, the historic cost of the depreciating asset is apportioned in equal amounts

for deduction over the period of its estimated economic life. The latter is normally specified in the tax code for each broad group of assets. For instance, if a piece of office equipment were to be purchased for \$800 and the tax code specifies that this asset group can be written off at a rate of 10 percent, then, assuming a zero salvage value, the yearly depreciation deduction will be \$80 for ten years. The example given here will fall under a particular asset class that yields a straight-line depreciation rate of 10 percent. A longer-lived asset—say, buildings—will be classified into another class yielding a lower straight-line rate of, for example, 2 percent. In this case, a building costing \$300,000 will attract an annual depreciation charge of \$6,000 for 50 years.

The Declining-Balance Method

In contrast to the straight-line depreciation method, the declining-balance method permits larger deductions in the earlier years of the useful life of an asset and smaller deductions toward the later years. Under this method, the computed depreciation charge is obtained by multiplying a fixed rate by the asset's book value. The asset's book value itself, unlike historical cost, declines from year to year by the amount of depreciation accumulated in earlier years. In practice, this method is also employed in conjunction with asset classes. Like the straight-line method, each group of depreciable assets is assigned to an asset class and written off according to the declining-balance rate applicable to that class.³⁶ The rates applicable to each class are supposed to accord roughly with the useful life of the asset. But, in practice, this may or may not be the case.

There are many instances where the rate of economic depreciation may not correspond to the tax depreciation rate. Again, for the sake of simplicity, if the total number of asset classes is deliberately compressed so that depreciation schedules serve little to discriminate between the treatment of longer-lived investments and shorter-lived ones, then the former will benefit relative to the latter because longer-lived investments are given the same, higher depreciation rate

as shorter-lived assets. This is true for both the straight-line and declining-balance methods. All other things equal, whether the declining-balance method would be more advantageous to a firm than the straight-line method, would depend on the given depreciation rates and the applicable discount factor. Since the two methods yield different time streams of depreciation, this comparison must be made on a present-value basis.

Other Depreciation Rules

Less common methods of depreciation include (1) initial allowance, where a more generous portion of the cost of capital assets is recovered in the first year, and the remaining undepreciated capital base is depreciated either by a straight-line or declining-balance method in subsequent years; (2) the sum-of-years-digits method (a variant of declining-balance method), where capital assets are depreciated each year at a linearly declining rate; (3) immediate expensing, where the total amount of the investment is deducted as cost in the first year of operation; and (4) switching (between declining-balance and straight-line methods), where the capital asset is depreciated according to the declining-balance method for a certain period starting from the purchase date, at a given declining-balance rate. At the end of the period, a switch-over is affected where the balance of the undepreciated capital base is depreciated according to the straight-line method at a straight-line rate.³⁷

Pooled Asset Accounts

To simplify the treatment of depreciation deductions, some countries have pooled fixed assets into several classes for tax depreciation. By placing all depreciable assets, which may or may not include real property, into a small number of pools (or classes) and by allowing a deduction of a specific percentage of the balance in each account every year, the number of asset classes will effectively be reduced.³⁸ The justification for prescribing a correct depreciation schedule for each asset so that, in theory, the ideal tax base of a firm can be derived, is replaced in this instance by the desire for greater simplification under pooling.

³⁶The mechanics of this method are as follows: suppose the depreciation rate for a particular asset class is x , assuming that the original purchasing price of the asset is one dollar, then after the first year, the book value of the asset is $(1-x)$. In the second year, applying the same depreciation rate x to the remaining book value of the asset, the amount $x(1-x)$ is the depreciation charge. In the third year, the asset's book value is further reduced to $(1-x) - x(1-x)$ or $(1-x)^2$; hence, the amount to be written off in the third year is $x(1-x)^2$. This leaves a book value of $(1-x)^2 - x(1-x)^2$ or $(1-x)^3$ for the next year and so on. In general, after t periods, the depreciation charge will be $x(1-x)^t$ and the undepreciated capital base will be $(1-x)^t$.

³⁷In practice, there are other combinations of switching. For instance, (1) between any two depreciation regimes, say, from declining-balance to sum-of-years-digits depreciation, or (2) at different rates within the straight-line method, where the asset is depreciated for the first t periods at a rate of x percent per period, and then normally at a lower rate of y percent per period in period $(t+1)$ onward. For a discussion on the optimal switching rule for an asset, see Sunley (1971) and Messere and Zuckerman (1981).

³⁸At the extreme, if there is only one pool, the concept of asset class will effectively be dismissed.

Generally speaking, it is possible to design as many asset classes as one desires so as to discriminate better in the treatment of long-lived and short-lived assets. But, for administrative ease, the number of classes of different assets is usually kept to a desirable minimum. It is not uncommon, for example, for the authority to group all vehicles into one asset class, even though a truck may depreciate at a faster rate than an office car; all plant and equipment into another class, even though a lathe may depreciate at a different rate than a furnace; all office equipment into a third class, even though office furniture may depreciate slower than computers, and so on. Compressing the number of asset classes tends to favor longer-lived assets over short-lived ones. Therefore, other than keeping the number to a manageable size, there is no reason to recommend a reduction in the number of asset classes.

In practice, pooled accounts are normally open-ended accounts.³⁹ Such an account is managed by add-

³⁹As opposed to closed-end accounts, where a pool is created for each year.

ing annually the total costs of all newly acquired assets less the proceeds from the disposal of any old assets to the balance of the pooled account. This system, which is compatible only with the declining-balance method, is attractive because it is simple to operate. It also solves the tax treatment problem concerning the disposal of assets. The deductible depreciation expense for the firm is the determined statutory depreciation rate multiplied by the balance value of the appropriate type of account every year.

Illustrative tax depreciation rates and evidence on the rates of economic depreciation

A set of tax depreciation rates for buildings and machinery is presented in Table IV.3 for selected OECD countries.⁴⁰ It is instructive to note the diverse methods and rates employed by the different countries in the table. For example, the straight-line method was employed throughout the 1980s by Italy, Luxembourg,

⁴⁰See Commission of the European Communities (1992), Table 8.12, p. 179.

Table IV.3. Typical Depreciation Rates on Industrial Buildings and Machinery

	1980		1985		1991	
	Buildings	Machinery	Buildings	Machinery	Buildings	Machinery
Belgium	10%DBx7 then 5%SL	40%DBx2 then 20%SL	10%DBx7 then 5%SL	40%DBx2 then 20%SL	10%DBx7 then 5%SL	40%DBx2 then 20%SL
Denmark	6%SLx10 then 2%SL	22.5%x1 then 30%DB	6%SLx10 then 2%SL	25%x10 then 30%DB (indexed)	6%SLx10 then 2%SL	30%DB
Germany	2%SL	20%DBx5 then 10%SL	5%SLx8 then 2.5%SLx5 then 1.25%SL	20%DBx5 then 10%SL	10%SLx4 then 5%SLx3 then 2.5%SL	30%DBx4 then 10%SL
Greece					8%SL	20%SL
Spain	7.5%DB	20%DB	7.5%DB	20%DB	7.5%SL	20%DB
France	5%SL	27.8%DBx7 then 11.1%SL	5%SL	27.8%DBx7 then 11.1%SL	5%SL	35.7%DBx5 then 5.5%SL
Ireland	100%	100%	100%	100%	50%x1 then 4%SL	50%x1 then 12.5%DB
Italy	7%SL	15.5%SL	7%SL	15.5%SL	5%SL	17.5%SLx3 then 10%SL
Luxembourg	4%SL	20%SL	4%SL	20%SL	4%SL	30%DBx2 then 20%SL
Netherlands	6.6%DB	25%DBx3 then 12.5%SL	6.6%DB	25%DBx3 then 12.5%SL	6.6%DB	25%DBx3 then 12.5%SL
Portugal	4%SL	20%SL	4%SL	20%SL	5%SL	31.25%DB
United Kingdom	50%x1 then 4%SL	100%	25%x1 then 4%SL	50%x1 then 25%DB	4%SL	25%DB
Japan	3.5%DB	23%DBx9	3.5%DB	23%DBx9	6.6%DB	30%DBx9
Switzerland	8%DB	30%DB	8%DB	30%DB	8%DB	30%DB
United States	3.5%SL	18.8%DBx2 then 12.5%SL	ACRS ¹	ACRS ¹	3.2%SL	28.6%DBx3 then 9.1%SL

Source: Report of the Committee of Independent Experts on Company Taxation, Commission of the European Communities.

Key: SL=straight line; DB=declining balance.

10%DBx7 then 5%SL means 10 percent declining-balance depreciation for seven years followed by depreciation at 5 percent straight-line until the asset is fully depreciated.

¹The accelerated cost recovery system (ACRS) in the United States during the mid-1980s involved complex depreciation provisions; typical straight-line depreciation rates for machinery were 8 percent for the first year, 14 percent for the second year, 12 percent for the third year, 10 percent for the next three years, and 9 percent for the next four years. Industrial buildings might typically be depreciated at 6 percent for 10 years and 5 percent thereafter.

Portugal, and, since 1991, Greece. On the other hand, Japan, Switzerland, and Spain (for the most part) have adopted the declining-balance method. In the 1980s, the United Kingdom provided an initial allowance of as much as 50 percent for buildings and machinery, while Ireland granted immediate expensing to both. The switching method (from declining-balance to straight-line) is used by Belgium (for buildings and machinery), and by France and Germany (for machinery only). Countries that implement another form of switching (from a higher rate to a lower one according to the straight-line method) are Denmark (for buildings and machinery) and Germany (for buildings only). Lastly, the United States adopted in the mid-1980s a complex system of depreciation provisions under the accelerated cost recovery system, where machinery was depreciated along a straight-line method at 8 percent for the first year, 14 percent for the second year, 12 percent for the third year, 10 percent for the next three years, and 9 percent for the next four years.

Table IV.4. Asset Classes and Rates of Economic Depreciation

(Annual percentage rates of decline)

Producer durable equipment	
Furniture and fixtures	.1100
Fabricated metal products	.0917
Engines and turbines	.0786
Tractors	.1633
Agricultural machinery (except tractors)	.0971
Construction machinery (except tractors)	.1722
Mining and oilfield machinery	.1650
Metalworking machinery	.1225
Special industry machinery (not elsewhere classified)	.1031
General industrial equipment	.1225
Office, computing, and accounting machinery	.2729
Service industry machinery	.1650
Electrical transmission, distribution, and industrial apparatus	.1179
Communications equipment	.1179
Electrical equipment (not elsewhere classified)	.1179
Trucks, buses, and truck trailers	.2537
Autos	.3333
Aircraft	.1833
Ships and boats	.0750
Railroad equipment	.0660
Instruments	.1473
Other	.1473
Private nonresidential structures	
Industrial	.0361
Commercial	.0247
Religious	.0188
Educational	.0188
Hospital and institutional	.0233
Other	.0454
Public utilities	.0316
Farm	.0237
Mining exploration, shafts, and wells	.0563
Other	.0290

Source: Hulten and Wykoff (1981).

By contrast, Table IV.4 provides the results of an empirical study showing the various asset classes estimated in the United States.⁴¹ Although it is in no way a definitive statement on economic depreciation rates because of difficult problems underlying such empirical work, Table IV.4 gives examples of how quickly various capital assets would decline in value in a year through normal use. From a group of 22 producer durable equipment and machinery items, and 10 groups of private nonresidential structures, the study found the annual percentage rates of decline to be (1) between 1.9 percent and 5.6 percent for structures; (2) between 6.6 percent and 18.3 percent for equipment (other than automobiles, trucks, and office equipment); and (3) between 25 percent and 33.3 percent for automobiles, trucks, and office equipment. The average rate of depreciation for all producer durable equipment was 13.3 percent and that of structures was 3.7 percent.

Inventory Valuation

DALE CHUA

- *What are the conventional approaches to valuing inventory?*
- *What are the tax implications for choosing FIFO or LIFO?*

As part of doing business, a firm holds inventory stocks such as raw materials, work-in-process, and final goods that will eventually be used to produce revenue for the firm. For a firm, holding a stock of current assets, such as inventory, is associated with three types of costs. First, there is the storage cost. This is deducted against revenue whenever it is incurred. Second, there is the cost associated with financing the inventory stock. Like other capital assets, only the interest cost of financing is a deductible expense, equity financing is not directly deductible against revenue. Third, there is the actual cost of the good held as inventory. The cost of the good becomes a deductible item only when the good in stock is removed from the inventory holding and used in the production process. This is the main issue addressed in this section.

Under standard accounting principles, inventories are generally recorded at the historical cost of

⁴¹See Hulten and Wykoff (1981), pp. 81–96.

acquisition or production,⁴² although the purchasing price of an inventory stock may have a different current value at some later point in time because of changing market conditions or rising prices. Two basic criteria have been used for the valuation of inventories, with different impact on costs, and hence different tax liability. Because of this, an enterprise must decide on a particular inventory costing principle, and once a method is adopted, most tax laws would not permit an enterprise to switch from one method of inventory valuation to another within an unjustifiably short time.

The first convention is FIFO (first-in-first-out), which assumes that the flow of goods is such that the earliest or first unit acquired is charged to cost first. The second convention is LIFO (last-in-first-out), which assumes that the most recent or last unit acquired is the first that is charged to cost.⁴³ Notice that the significance of adopting a particular convention quickly evaporates when prices are stable because LIFO and FIFO will yield identical costing. During inflationary periods, however, these methods have a different cost implication and tax liability for an enterprise.

Impact of Taxes on Method of Inventory Valuation

During inflationary periods, which cost accounting convention is most likely to yield the greatest benefits to an enterprise? Under LIFO, the higher-cost goods (those acquired later) are charged to cost first before the lower-cost ones (those acquired earlier). Therefore, the costs of stock at the end of the period are calculated for the inventories sold valued at the most recent price. As a result, the nominal profits calculated are less likely to be distorted by inflation; that is, LIFO will lead to lower reported profits and the tax liability of the firm will not be unduly increased with inflation. In other words, the "tax holding cost" of inventories will not be very high under LIFO. For this reason, at least for growing firms, a few experts have recommended

that this method be adopted during times when prices rise.⁴⁴

The opposite is true under FIFO where lower-cost goods acquired earlier are charged to cost before the more recently acquired, higher-cost ones. Therefore, the costs of stock at year end are calculated on the basis of the price of earlier acquisitions, resulting in inventories sold being valued, during inflation periods, at below their replenishment cost. In this way, the "tax holding cost" of inventories will be higher than under LIFO because this method of accounting for the costs of stock at the end of the period results in higher reported nominal profits and higher taxes for a FIFO firm.⁴⁵

Assuming a single corporate tax rate, the present value of taxes payable is thus higher under FIFO than under LIFO. A LIFO firm, however, will be less able to benefit from the calculus of accounting when its inventory stock is drawn down because whenever a LIFO firm dips into lower cost stock accumulated earlier, it cannot avoid expensing them at a lower cost.⁴⁶ Hence, a LIFO firm cannot avoid having to pay more taxes on its higher profits that arise from the depletion of its inventory stock. In the extreme, when a LIFO firm completely exhausts its inventory stock, its marginal inventory costs to be expensed against revenue will be exactly identical to those of a FIFO firm. Therefore, the marginal tax liability for a LIFO firm will be the same as that of a FIFO firm when its inventory stock is exhausted. If so, LIFO firms will have a tax incentive not to deplete their inventory stock or, alternatively, LIFO firms will have an incentive to hold larger inventory stock.⁴⁷

In practice, however, there are nontax factors that will also influence the FIFO/LIFO choice. For example, by following the designated convention, a LIFO firm will tend to have lower reported earnings (if it is required by law to have conformity between book and tax accounts) as well as a lower book value. As a mar-

⁴²Except when the adoption of the criterion results in a value higher than the prevailing market price. In this case, tax laws of many countries allow for a reduction in the value of the inventories, or the formation of a corresponding reserve.

⁴³A permutation of the FIFO and LIFO convention is the average cost convention, where the unit withdrawn is charged at the average cost of those in the stock. Another convention, adopted when the inventory unit used in production is easily identifiable or costly, is the actual cost or identification method. Yet, other less well-known methods have also been suggested; for example, valuation at lower of cost or market and the retail method. For a survey of the different methods, see Foss, Fromm, and Rottenberg (1981), pp. 10-15.

⁴⁴See, for example, Goode (1981). This recommendation would be much less compelling if inventory is primarily financed by debt, since in this case, inflation would automatically result in higher interest cost deductions for the firm.

⁴⁵Another way to see the impact of inventory valuation on the tax liability for an enterprise is to consider the extreme. Suppose that the selling price of an output is equal to its replacement cost. Then, under FIFO, a firm will pay taxes on the difference between the selling price and the original cost of purchase. Under LIFO, however, it will not have to pay any taxes if its closing inventory at the end of the year is equal to opening inventory at the beginning of the year, because the selling price is just equal to the replacement cost, hence, giving rise to no book profit.

⁴⁶See Haktiwanger and Robinson (1987), pp. 3-5.

⁴⁷This theoretical result is demonstrated in a one-period model by Cohen and Pekelman (1979).

ket signal, such characteristics may not be well received. Hence, it may not be in the interest of a firm to adopt LIFO, given that in practice, it has to approach the market for funds. By the same token, a LIFO firm tends also to exhibit greater fluctuation in its reported profits, especially during periods when inventories are being depleted, whereas FIFO firms tend to show more stability in their profit stream. Furthermore, the bookkeeping cost for LIFO may be higher than for FIFO.⁴⁸ In summary, although tax considerations in times of inflation may suggest that a firm should adopt the LIFO convention if it seeks to maximize its after-tax cash flow, other firm-characteristic considerations may provide a counterweight to its widespread use.

Loss Carryforward and Loss Carryback

DALE CHUA

- *What are loss carryforward and loss carryback?*
- *Should full loss offset be a feature of a corporate income tax?*
- *What is the impact of imperfect loss offset for investment?*

By the very nature of doing business, firms undertake risks. A successful firm is rewarded with profits, and corporate tax laws worldwide require all profitable firms to pay corporate taxes. Now, what happens if a risk-taking firm incurs losses? Because a well-designed tax system should not discriminate against risk-taking enterprises that may end up making losses, operational losses incurred by a firm should ideally be treated symmetrically with profits. In other words, given that a profitable firm pays taxes, a loss-making firm should receive a tax refund. Although most corporate tax systems recognize the need to provide some tax relief to firms that report tax losses, a perfect loss-offsetting mechanism that treats positive and negative tax liabilities symmetrically remains ideal.

Tax authorities are unwilling to introduce full refundability for corporate taxes because it implies a loss of government revenue. (Full refundability may also be subject to abuse and the cost of monitoring, potentially high.) Although a fear of revenue losses is a legitimate concern in times of budgetary constraints, whether this

fear is substantiated over the longer term remains an issue in the loss-offsetting literature. Proponents argue that the provision of loss offsetting to tax-loss firms today will, on average, be accompanied by future tax revenue as these firms regain their competitive position, even though the present value of the future tax dollar may not be known with certainty. From the lack of concrete evidence of outright, full refundability to individual firms, it is obvious that tax authorities are not persuaded by this argument.⁴⁹ Their preoccupation in an imperfect world is the fall in net tax revenue collected in any given year if perfect loss offsetting is grafted onto the corporate tax law. Furthermore, opponents argue that changing economic conditions that bring new opportunities for investment also imply a necessary foreclosure of less efficient and economically obsolete firms. Full loss offset prolongs the breakup of such firms, thereby tying up capital and scarce resources.

Loss Carryforward and Loss Carryback

In practice, tax laws provide less than full loss offset for tax-loss firms.⁵⁰ Most tax systems permit tax losses to be carried forward either indefinitely or over a fixed period of time. Such losses, however, are carried forward without interest. Naturally, allowing carryforward with interest could be equivalent, in present value terms, to an immediate refund assuming they are ultimately usable. Since the present value of loss carryforward without interest diminishes with time, the future tax savings derived from such a provision will likewise fall over time.

Some countries, however, permit limited loss carrybacks. Loss carrybacks are usually restricted to those tax-loss firms which have paid some taxes during the years prior to incurring a loss. Provided that the current year tax loss is not greater than the sum of taxes paid in earlier years—usually restricted to three or five years—a firm permitted to carry back its losses would receive a tax refund from the tax authority. This is a limited tax loss provision because it is plausible that a firm may have a particularly large current year tax loss that is greater than potential carrybacks. Or, alternatively, a firm may string up a series of tax losses in consecutive years that will be larger than the potential carrybacks.

⁴⁸In addition, agency cost—a factor largely dependent on a firm's ownership structure—can also affect the FIFO/LIFO choice. See, for example, Dyl (1989). The study shows that managers of widely held firms are found to select the accounting method that furthers their own interests, thus causing firms' owners to bear agency costs that appear to be substantial.

⁴⁹It should be noted that some tax systems do allow for group relief under a consolidated account basis, which could be thought of as some form of loss offsets for many companies.

⁵⁰For an empirical study of the impact of imperfect refundability on the investment behavior of a firm, see Mintz (1988), pp. 225–31.

Losses that cannot be carried back can usually be carried forward to be offset against future tax liability. Although loss carryback can put strain on the government budget, its main weakness is that it puts newly established firms at a comparative tax disadvantage compared with more mature firms. The reason for this is that new firms will have no carryback and therefore will not be able to benefit from this provision.

Imperfect Loss Offset and Its Effect on Investment

How does a partial loss offset affect the incentive structure of a corporate tax? The two areas most seriously affected by an imperfect loss-offset provision are (1) new investment and (2) the financial structure of a firm. First, imperfect loss offset dampens a firm's incentive to invest. To see this, recall that for any given firm, the cost of investment is lowered when depreciation allowance can be charged against revenue whenever they are accrued. In the case of a tax-loss firm, accrued depreciation charges may not be realized immediately when there is less than perfect refundability, although it will be absorbed at a later point in time. The present value of a loss deduction carried forward without interest, however, is less than if accrual and realization occur at the same time. The result is that the investment plan for some firms could be changed. For example, if the corporate income tax favors short-lived investment, then compared to a profitable firm, a tax-loss firm will have a greater incentive to invest in long-lived investment. This is because a tax-loss firm gains more from the postponement of tax payment from the asset's earnings compared with the loss from the postponement of its tax depreciation benefits.⁵¹ Hence, profitable firms are more inclined to invest in short-lived investment projects than tax-loss firms.

Second, a less than perfect loss offset impacts on a firm's financial structure because fully deductible interest cost of financing is worth less to a tax-loss firm if the full interest payment cannot be deducted at cost when it is accrued. A firm in a tax-loss position is therefore less likely to favor debt financing than a profitable firm. But the argument does not stop here. Not only does imperfect loss offset affect a firm's debt-equity structure, but a chosen financial structure will also influence a firm's subsequent profitability through its future interest deductions. Hence, imperfect loss offset may be even more costly for a highly levered, tax-loss firm. Turning the argument around, a more generous tax-loss offset provision will induce greater corporate borrowing.

⁵¹See Auerbach and Poterba (1987), pp. 305–07.

Full Loss-Offsetting Mechanisms

Although full loss offsetting is rarely ever implemented, for completeness, this section discusses two ways to achieve it if necessary.⁵² The first is for the tax authority to provide a tax credit equal to the value of the tax write-off of losses. Under this method, a refund is paid to the tax-loss firm, just as a tax is paid when the firm is making profit. It has the advantage of injecting cash flow into the tax-loss firm but it could be a very costly option for the government in times of budgetary constraints.

A second way to achieve full loss offsetting is to provide the losses carried forward with interest, at the nominal market rate. This will be equivalent to the immediate refund in present value terms as long as the corporate tax rate remains unchanged over time. In case the enterprise is liquidated, tax losses carried forward with interest should be applied to the revenue received from the sales of assets. A tax refund adjustment could then be made at that time if the revenue from asset sales is too small to be fully written off against loss carried forward. This method is less costly for the tax authority but it provides little immediate help for cash-strapped tax-loss firms.

Inflation Adjustment

DALE CHUA

- *Why is inflation adjustment necessary?*
- *What factors cause taxable profits to be mismeasured and why?*
- *What are the common schemes for inflation adjustment?*

Inflation presents a basic problem for all unindexed corporate income taxes. A firm's corporate tax liability is generally based on a measure of its profits derived from historic cost accounts, and such accounts mismeasure the real profits of the firm during inflation. The consequence is normally an inflated tax liability for the enterprise. Therefore, in the interest of maximizing its after-tax returns to its shareholders, an enterprise may undertake those activities that would generate the most favorable tax treatment so as to min-

⁵²See Boadway, Bruce, and Mintz (1987), pp. 161–62. A third method that will also yield a full loss offset is through the integration of the corporate and personal income tax systems (see earlier section). Under this method, tax losses could be offset at the shareholder level as long as the tax rate of the investor and that of the company is the same.

imize its tax liability rather than those that would yield the highest returns to society. Furthermore, the full impact of inflation on an enterprise also depends on its financial structure, the kind of capital employed in its operations, and its need to hold inventory stocks in the course of doing business. Hence, not only does the tax system distort the economic behavior of each firm during times of rising prices, it also creates interfirm distortions that are dependent on the basic characteristics of each firm.

Why Profit Is Mismeasured with Inflation

The reason why profit is mismeasured is because the balance sheet of an enterprise contains items of a nonmonetary nature (such as buildings and machinery) as well as items of a monetary nature (such as accounts payable and receivable, and cash). A comprehensive adjustment system must account for gains and losses on liabilities and assets fixed in money terms and some other items.⁵³

Specifically, there are five areas of concern when inflation is present. First, the real value of depreciation allowances is lowered with inflation. Because depreciation is generally based on historical cost accounting, its value may be far lower than the real cost of depreciation. As a result, the real tax liability of a firm is over-reported. In the absence of any compensation, the unintended side effect will be to discourage firms from undertaking large capital investments in general and those that are long-lived in particular.

Second, similar to depreciation allowances, without inflation adjustment, the value of loss carried forward to a tax-loss firm will be eroded by inflation.⁵⁴

Third, tax systems based on FIFO conventions effectively treat the increase in the value of stock inventories as a source of income, with no allowance for that part which is due to inflation; a firm holding stock inventories will be obliged to pay taxes on a fictional source of income. In the absence of inflation adjustment, such a tax system will induce a suboptimal level of inventory investment.⁵⁵

Fourth, without inflation adjustment, enterprises are permitted to deduct as costs the decline in the real value of their debts due to inflation. This is because the full nominal cost of debt finance is a deductible ex-

pense even though an ideal measurement of real profit would deduct only the real interest cost. Because nominal interest rates tend to rise with inflation, the real value of the firm's debt falls when inflation is anticipated. By allowing the firm a full deduction for the nominal interest cost, the tax system allows the firm to deduct part of the repayment of principal, over and above the real interest cost of debt financing. Hence, the true profit of the firm is understated. Therefore, without inflation adjustment of interest, a firm seeking to maximize its after-tax returns will be induced to undertake more debt financing with inflation.⁵⁶ This unintended tax-induced effect will lead to higher leverage ratios.

Fifth, inflation creates illusionary capital gains on assets and liabilities. To illustrate, suppose, at the risk of oversimplification, that an enterprise holds an asset, A , which earns a return. In addition to the income earned through its operation, the taxable income of the enterprise would also include (1) income from the holding of assets, rA , where r is the rate of return on A , and (2) the accrued capital gain or loss, ΔA , on the asset held over the period. The taxable income base⁵⁷ for the enterprise will be

$$Y = X + rA + \Delta A,$$

where X is profits from the operation of the firm (excluding the holding of asset A). Ideally, with inflation, the taxable base should be defined in real terms as:

$$Y/P = X/P + rA/P + \Delta(A/P),$$

where $\Delta(A/P)$ is the change in the real value of assets held over the accounting period. This can be rewritten as:

$$Y/P = X/P + rA/P + \Delta A/P - \Delta P/P \cdot (A/P).$$

If this is the base used for taxation, inflation will not present any problem. But, the enterprise's tax liability is based on nominal terms, and the nominal income tax base consistent

$$Y = X + rA + \Delta A - \pi A,$$

where π is the annual inflation rate. Therefore, the real asset value with inflation should be

$$rA + \Delta A - \pi A,$$

where πA is the loss in the real asset value due to inflation. Because there are no provisions for the loss in the

⁵³See Goode (1981), pp. 249-74.

⁵⁴Even without inflation, the value of loss carried forward will diminish across time given a positive discount rate. Inflation compounds the problem. In general, full protection is given if losses can be carried forward with interest.

⁵⁵See Boadway, Bruce, Mintz (1987), p. 24. See also section on inventory valuation under inflation.

⁵⁶With hyperinflation, this consideration will likely dominate all other factors discussed in this section.

⁵⁷This illustration is a modification of the example presented in Boadway and Wildasin (1984), pp. 262-64.

real asset value in inflationary periods, a corporate income tax, like the personal income tax, imposes a burden on the enterprise through the taxation of illusionary capital gains.

In sum, on the basis of historical cost accounting alone, inflation could either overreport or underreport the real profit of an enterprise. Therefore, an enterprise may be either better off or worse off when adopting a historical cost accounting convention. The magnitude of mismeasurement of taxable profits will be dictated by the strength of opposite forces delineated above, including some firm-specific characteristics such as the debt-equity ratio and the capital investments that are undertaken.

Adjustments Scheme: Balance Sheet Versus Single Account Approach

To tackle the problems associated with the mismeasurement of taxable income in inflationary periods, this section considers two inflation adjustment schemes: (1) an overall approach and (2) a partial account-by-account approach.

Balance Sheet Approach

A full balance sheet adjustment approach, or a comprehensive profit adjustment scheme, is based on the indexation of all assets and liabilities in the balance sheet. Both assets and liabilities are revalued frequently, usually yearly, to correct for an over- or understatement of income during high inflation periods.⁵⁸ The principle behind this approach is that a monetary correction is made to the unadjusted profits and income statement to arrive at an adjusted tax base on which the corporate tax is then applied, while in the process, this approach accounts for the impact of inflation on all aspects of the firm's operations. This approach is made operational through the accounting identity:

$$\text{Assets} = \text{Liabilities} + \text{Net Worth.}$$

Since assets and liabilities comprise in each a monetary component and a nonmonetary component, the above identity can be expressed as:

$$\text{Monetary Liabilities} - \text{Monetary Assets} =$$

$$\text{Nonmonetary Assets} - \text{Nonmonetary Liabilities} - \text{Net Worth.}$$

⁵⁸It should be noted that for countries adopting only a partial indexation on the assets side, a move toward full indexation with the indexation of the liability side as well may, at times, be judged a negative development by some investors.

From an economic viewpoint, the adjustment for the inflation-generated profits and losses for each period can be made through either the monetary side or the nonmonetary side of the accounting identity. But, an adjustment through the monetary side creates some accounting difficulties. Accordingly, to overcome this, established adjustment mechanisms in South American countries are affected primarily through the nonmonetary side, whereby the inflation-generated profits and losses are given by:

$$(\text{Nonmonetary Assets} - \text{Nonmonetary Liabilities} - \text{Net Worth})$$

multiplied by the monetary erosion factor,

where the monetary erosion factor is defined as the ratio of the annual rate of inflation to one plus the annual rate of inflation.

This method of correction for inflation requires all nonmonetary assets and nonmonetary liabilities to be appropriately indexed. First, the values of all nonmonetary assets such as inventory, depreciation charges (both actual and accumulated), and all other fixed assets are adjusted upward for inflation through various price indices. This results in an equivalent monetary correction gain in the income statement of the enterprise. Second, nonmonetary liabilities such as indexed debt and debt denominated in foreign currencies, among other items, are likewise revalued to account for inflation. The difference between the adjusted (upward) values of these nonmonetary liabilities and their nominal accounting values will yield a corresponding monetary correction loss in the income statement of the enterprise. Finally, the initial net worth is also corrected by an appropriate index, and would also give rise to a monetary correction in the income statement.

The issue concerning the appropriate index is important for a full balance sheet approach. For instance, the use of a general price index such as the CPI for all adjustments may be adequate only for some nonmonetary liabilities such as indexed debt, but it may not be sufficient to capture the true cost of depreciation charges on assets. The following questions will continue to present challenging problems for inflation adjustment: (1) Is there a general price index of depreciable assets or even for a specific class of assets? and (2) If one exists, how accurately does it measure the true, real value of depreciation? To minimize this concern, whenever possible, a set of price indexes covering as many different nonmonetary liabilities and assets as possible should be constructed and updated regularly.

Single Account Approach

With the same goal of correcting for inflation-induced distortion, the single account approach provides piecemeal, partial adjustment for an enterprise. Rather than being comprehensive, adjustments are made only to selected individual accounts, for example, the capital depreciation account or the inventory account. Either these adjustments could be ad hoc with only a temporary effect, such as a once-and-for-all adjustment, or they could be periodic, whereby an annual correction is allowed. Like the full balance sheet approach, these adjustments encounter the same difficulties underlying the choice of a proper price index for adjustment.⁵⁹

Loan Loss Provisioning

JULIO ESCOLANO

- *How is bad debt owned by banks treated for tax purposes?*
- *What are the advantages and disadvantages of different tax treatments of bad debt?*
- *Should bad debt allowances be tax deductible?*

An important part of a business' worth is kept in the form of loans, credit, or financial claims on others. Different forms of financial claims constitute the majority of assets of commercial banks and other financial institutions. To determine business income, for either tax or book purposes, it is essential to assess the change in the value of these assets that takes place during the relevant fiscal or accounting period. When financial assets are frequently transacted, their market price provides an adequate method to ascertain their current value. Market prices, however, are not readily available for many financial claims such as loans, consumer credit, etc. Nevertheless, some of these assets may become wholly or partially worthless before maturity if circumstances show that they are likely to be uncollectible. Hence, specific rules for the tax or financial treatment of bad debt and its relation to taxable or financial income need to be established.

⁵⁹Some have argued that inflation adjustment should focus on other methods such as accelerated depreciation because a reliable price index is difficult to obtain. But, the use of accelerated depreciation as an adjustment mechanism is not without problems. For example, even if one could agree on the "correct" rate of accelerated depreciation, this would normally only be extended to new investments and would still leave the question of adjustment for existing capital unresolved.

This section focuses on the tax treatment—as opposed to regulatory or book treatment—of bad debt of banks and financial institutions. Loan losses of financial institutions are considered to have a potentially larger destabilizing effect than capital losses in other industries, and consequently, the tax treatment of bad debt of banks and financial institutions, in most countries, follows specific regulations.⁶⁰ Furthermore, financial institutions are subject to tight financial regulations and the regulatory treatment of loan losses has influenced and, on occasion, determined their treatment by the tax authority. Nevertheless, it should be noted that the principles underlying financial accounting regulations and tax accounting are not necessarily the same. Financial regulations, aiming to preserve the integrity of the balance sheet and the soundness of the financial system, will encourage or force the provision of reserves, thereby diminishing income. Tax accounting, on the other hand, will define taxable income seeking to match economic income as closely as possible to minimize distortions and tax avoidance. This implies that provisions for some reserves, even if they are mandated by financial regulations, do not need to be tax deductible.

Deduction for Bad Debts

Historically, two methods have been used to compute the deduction for bad debts. These are the charge-off and the reserve methods.

Charge-off method

The charge-off method recognizes an expense for bad debts only as they actually become either wholly or partially worthless. At such time as a receivable is determined to be uncollectible in whole or in part, the receivable is reduced by the amount of uncollectibility, and an expense is recognized in an equal amount. Thus, the bad debt deduction claimed for any year must be supported by showing that the debt had some value at the beginning of the year and that some change in the debtor's condition prompting the loss occurred during the year. If an amount previously charged off as uncollectible is later recovered, the re-

⁶⁰Since most assets of financial institutions are loans and different forms of credit, debt default constitutes a category of losses particularly relevant in the financial sector. Moreover, financial services are an essential input in all other economic activities. Inadequate management of risk by financial institutions has the potential to trigger a chain of bankruptcies with economy-wide negative consequences. The need to avoid these possible "negative externalities" is generally considered the main reason for government regulation. The guarantees provided by government regulation and enforcement of minimum prudential standards may also be needed to induce financial intermediation in the case of small and medium depositors.

covery is treated as a separate income item at the time of collection or reintroduction of the loan in the books.

In determining whether a debt is worthless, all pertinent evidence, including continual nonperformance, adequacy of the collateral and financial condition of the debtor may be considered. An inherent difficulty in identifying the year of deduction is that worthlessness often results from a gradual deterioration in the debtor's financial condition rather than from an easily identifiable event. Simple mechanical rules can be used to establish partial or total uncollectibility for some categories of standardized loans such as consumer credit, real estate loans, etc. Less standardized loan contracts and those with face values above some threshold may require specific evaluation.⁶¹

Reserve method

Under the reserve method, receivables are recorded at their face value until they become effectively worthless. A reserve account is set up, however, as an allowance against the eventuality that some of the receivables may prove to be uncollectible.⁶² For tax purposes, the balance of this reserve cannot exceed certain limits, which depend on the type of reserve. The annual deduction for bad debts is the amount necessary to bring the initial balance of the reserve, adjusted for actual bad debts and recoveries that occurred during the year, to the allowed ending balance.⁶³ Thus, it is the annual addition to the reserve that reduces pretax income while actual loan losses, when they materialize, are charged against the reserve, leaving income unchanged.⁶⁴ Reserves for bad debts can be classified in two main categories according to whether they are of a general nature or whether they are linked to specific loans with identified loss potential.

⁶¹For example, continual nonperformance during a given period, loss in the value of collateral beyond a given percentage, etc., may serve as mechanical criteria to write off consumer credit, home mortgages, and other standard loans. Financial institutions typically hold a large number of these loans with relatively small face value. Thus, it might be unfeasible to evaluate further the individual circumstances of each loan charged off. In contrast, it is usual to require specific justification for charging off less standardized loans and loans with high face value.

⁶²Some countries such as Germany and Switzerland also allow "hidden" reserves. These reserves are maintained by recording receivables at values lower than their face value. This undervaluation is meant to reflect the probability of default. "Hidden" reserves are usually not tax deductible.

⁶³Limits for general reserves are often determined by the tax authority as a percentage of total loans. Specific reserves are limited by the amount of doubtful loans (as defined by tax and accounting regulations).

⁶⁴Actual loan loss, however, may affect taxable income indirectly. When the allowed tax-free reserve is set as a given proportion of assets (general reserves), charging off bad debt reduces the balance of the reserve and increases the deductible allowance in the current year.

- *General reserves.* The allowed level of reserves is computed as a percentage of the face value of the loan portfolio and is not linked to the collectibility of any particular outstanding loan. The reserve-to-loans ratio can be a predetermined percentage for each type of loan, identical for all taxpayers, or it can be computed as a moving average of the proportion of bad debt to total value of the loan portfolio in past years ("experience method"). Under the latter method, the averaging period should be longer than a typical business cycle to maximize the income smoothing effects of reserve formation.⁶⁵

- *Specific reserves.* Additions to bad debt reserves are allowed only on a loan-by-loan basis whereby individual loans or receivables are evaluated as to their future collectibility. The tax deductible allowance may vary from a low percentage of the face value to a complete write-off of the loan.

The specific reserve method differs from the charge-off method in that under the charge-off method, a debt is written off only when it has been proven wholly or partially worthless. In contrast, under the specific reserve method, loans do not need to be worthless when the provision is made and taxable income is reduced. A tax-deductible provision can be made, provided that the facts and circumstances are such that collection is highly questionable or improbable. Changes in the financial situation of the obligor—such as suspension of payments or bankruptcy—or losses in the value of the collateral may justify provisioning. Actual worthlessness of the loan, against which a specific reserve is made, might actually occur years later.

Comparison Between the Reserve and Charge-Off Methods

A loan is a contract stipulating a stream of payments to be made by the borrower to the lender. This stream of payments includes interest payments and repayment of principal. The value of the contract at any point in time is the value of its expected future cash flows, discounted at the prevailing rate of interest on alternative riskless assets—such as, for example, treasury bills.

Because the lender recognizes the possibility of borrower default, the contract interest rate is generally higher than the risk-free interest rate. The difference

⁶⁵In the United States, reserve methods were disallowed for most banks and financial institutions as part of the 1986 tax reform. Prior to their repeal, both the experience and the fixed percentage methods were in use. Under the experience method the standard averaging period was six years. The proportion of eligible loans used to compute allowed reserves under the fixed percentage method ranged from 0.6 percent to 1.2 percent.

between the contract and the riskless interest rate is the risk premium. Amounts received as risk premium compensate the lender for expected loan losses.⁶⁶

To define the tax base, taxable income derived from a loan portfolio should match as closely as possible the underlying economic category, that is, economic income. Economic income from a loan portfolio equals net cash flow yielded during the fiscal year plus change in the value of the loan portfolio. The net cash flow yielded by a loan portfolio is equal to earned interest including the risk premium, plus repayment of principal minus new additions to the loan pool. The value of a loan portfolio is the present value of its expected flow of future payments discounted at the prevailing rate of interest on riskless assets. It can be shown⁶⁷ that if the tax base does not match economic income, the value of a portfolio with loan losses will be altered by the presence of the tax and by its rate. Tax-induced changes in the value of risky assets distort their profitability in relation to riskless assets. Thus, the income tax can penalize or encourage the assumption of risk as a side effect of the treatment of bad debt.

Receipts associated with the risk premium are part of interest receipts and take place throughout the life of a loan portfolio in proportion to outstanding loans. In contrast, loan losses may be concentrated in the earlier or in the latter periods of the life of the loans. The disparity between the timing of risk premium receipts, which create a tax liability, and associated loan losses, which give rise to a tax deduction, is the cause of the tax-induced distortion. When this difference in timing results in a deferral in the recognition of income with respect to the recognition of the associated loss, a corresponding deferral in tax liabilities occurs and the portfolio value is favored by the tax. Similarly, the value of a portfolio is impaired by the tax when the recognition of risk premium income occurs earlier than the recognition of the associated loss.

Neither the charge-off nor the reserve method taxes economic income accurately. Because of the mentioned discrepancies in timing of risk premium income and corresponding loan losses, both the charge-off and reserve methods tend to favor loan portfolios with early loan losses and to disadvantage those with late loan losses. It can be shown that the charge-off method is neutral when losses are evenly spread throughout the

life of the loan portfolio. Actually, diversification of portfolios and continuity in the flow of amortization and new loan issuances smooth the flow of defaults over time. Correspondingly, the charge-off method could be expected to be roughly neutral in practice.⁶⁸

The reserve method, however, adds a specific distortion. Since a present deduction is allowed for losses that may occur far into the future, the reserve method results in a treatment of financial risk uniformly more favorable than the charge-off method.⁶⁹ This was one of the reasons based on which the U.S. Congress repealed the reserve method in 1986.⁷⁰

Both the reserve and charge-off methods share the difficulty of identifying uncollectible debt without opening loopholes for tax avoidance. It could be argued that the problem is more severe in the specific reserve method since, due to its prudential nature, the deduction needs to be granted before there is conclusive proof of uncollectibility. As a result, intertemporal arbitrage of tax liabilities may result in significant losses of tax revenue. This is one of the reasons behind the present trend toward tighter conditions for the deduction of specific reserves, disallowance of general and hidden reserves, or adoption of the charge-off method.

Generally, tax deductions for losses in receivables of nonfinancial institutions and contingent losses of nonfinancial assets are allowed only upon realization. In this sense, the reserve method amounts to a tax expenditure in favor of the financial sector.

Nonetheless, tax deductibility of some reserves may be advisable in special circumstances. Risk management techniques, such as portfolio diversification, can be applied only when the risk of default is independent across loans. For some groups of loans, however, the risk of default might be highly correlated. This is the case, for example, of sovereign debt from some particular country (or set of countries) undergoing significant external imbalances. When a large proportion of assets of the financial sector are affected by this type of possible loss, the allowance of tax-deductible specific reserves might be necessary.⁷¹ It should be clear,

⁶⁶The risk premium is not unlike the difference between the nominal and the real interest rates in the presence of inflation. This difference compensates the investor for the expected loss in the real value of his assets. Similarly, the risk premium compensates the lender for the loss in value of the loan portfolio caused by the recognition of part of the portfolio as bad debt.

⁶⁷See Samuelson (1964).

⁶⁸Portfolio diversification can average out the idiosyncratic risk of individual loans. It cannot, however, eliminate systemic risk stemming from general economic shocks that may affect simultaneously all or most investments.

⁶⁹Generally, a loan needs to have been classified as delinquent for several periods before it is reclassified as uncollectible. The more favorable treatment of loan losses by the reserve method has been justified as partial compensation for taxes paid on accrued but unpaid interest income.

⁷⁰See U.S. Department of the Treasury (1991).

⁷¹Many creditor countries allowed the creation of tax-deductible reserves during the 1980s to help their financial systems to cope with the international debt crisis. For an exhaustive treatment of this topic, see Hay and Paul (1991).

however, that tax deductibility of provisions for loan losses does not alter, by itself, the timing or the size of the losses.

Selected Country Practices

United States

Prior to 1986, banks could deduct from taxable income provisions for loan losses in an amount based on actual loss experience over the last six years ("experience method") or equal to a set percentage of eligible loans ("percentage of eligible loans method"). The tax reform of 1986 adopted a pure charge-off method. Consequently, tax deductions for loan loss provisioning were disallowed. The only exceptions are banks with assets below \$500 million and some specific reserves related to international loans to specific countries and mandated by federal regulators. Notwithstanding their tax treatment, banks routinely allocate after-tax profits to specific and general reserves that are normally included in regulatory capital and are subject to review by regulators and external auditors for consistency and prudence.

Germany

In Germany, as in some other European countries, there is a somewhat tighter link between tax and book accounts. German banks create specific, general, and undisclosed ("hidden") reserves. Specific loan loss reserves are not included in regulatory capital and are generally tax deductible.

Taking effect on January 1, 1989, the mandatory and tax deductible character of general reserves was repealed. Hidden reserves have to be disclosed to the regulatory authority and they are not tax deductible. These hidden reserves allow German banks to smooth out fluctuations in earnings and report steady profits.

France

French banks are allowed to make specific and general loan loss provisions. Specific provisions are established against individual assets whose recovery is doubtful and tax deductibility is granted on a case-by-case basis. General provisioning is established against other assets and is tax deductible provided that it does not exceed certain limits. The main limits are that additions to reserves cannot exceed 5 percent of pretax income and that the stock of loan loss reserves cannot be more than 0.5 percent of medium- and long-term outstanding loans.

Japan

Tax-deductible specific reserves can be established up to 50 percent of the nominal value of loans that meet at least one of the following two conditions: there is a formal declaration of default against the borrower, or principal and interest have not been paid in the last four years.

Additions to general reserves are tax deductible until general loan loss reserves reach a level equal to 0.3 percent of outstanding loans, or total outstanding loans multiplied by the average loan loss ratio for the three years preceding the reporting year.

Issues Relating to Personal and Corporate Income Taxes

Integration of Personal and Corporate Income Taxes: Advantages and Disadvantages

JOHN R. KING

- *What are the arguments of basic principle for and against a classical (or separate entity) corporate tax system?*
- *What particular distortions does such a system create compared with an integrated system of taxation for personal and corporate income?*
- *What disadvantages could there be in moving from an existing classical corporate tax system to a more integrated system?*

An income tax is usually levied not only on individuals but also on legal entities. In many countries, the same income tax law applies to both, but particular provisions (concerning rates of tax, for example) distinguish between the income of individuals on the one hand and that of companies on the other. In other countries, separate tax laws are applied to the incomes of individuals and companies.⁷² From an economic point of view, the main issue of substance in this area, however, is not the legal form of the tax on the incomes of different entities but rather the extent to which provisions are made under the corporate income tax, the personal income tax, or both, to reduce or eliminate "double taxation" of income which is earned by a corporation but accrues—in one form or another—to the individuals who are its ultimate owners.

Such provisions seek to integrate, to a greater or lesser degree, the income taxes that are levied separately on companies and on the returns they provide to individuals who are their ultimate owners. Particular schemes of integration are described and discussed in the next section; this section focuses on the general case for—and against—some forms of integration.

⁷²Partnerships of various kinds, which may be established under most countries' legislation as an additional form of legal person, are sometimes treated for tax purposes in the same way as sole proprietorships and sometimes in the same way as companies.

Arguments of Basic Principle

In its strongest form, the case for integrating individual and corporate income taxes rests on two basic propositions. The first is that taxation should be levied, as a matter of fiscal equity, according to "ability to pay"—as measured by income. The second is that corporate entities do not have an ability to pay taxes, in the relevant sense; they are simply a "conduit" through which income flows to individuals who are their ultimate owners.

Combined, these propositions appear to suggest that corporate income should only be taxed in the hands of the individuals to whom it accrues. They do, however, leave room for a separate corporate income tax to be justified as a withholding tax, which may be a useful means of ensuring that income flowing through the conduit is taxed in a comprehensive and timely manner and that the base of the individual income tax is protected. Many economists, including some who have not advocated full integration, have argued that this withholding function is indeed the main argument for the imposition of a tax on corporate income.

It is less easy to summarize the case in principle against integration—or in favor of what is commonly termed a "classical" corporate tax system, in which income tax is levied separately, both on company income and on dividends received by shareholders. The defense of this system may be based on denying one of the propositions on which the integrationist case rests, or both.⁷³

First, some are content to assert simply that companies are "separate entities," legally distinct from the individuals who own them, and to rest the case on that issue of legal form. Second, it has been argued that the integrationist case is based on a concept of "ability to pay" developed by utilitarian philosophers such as Bentham and Mill, which now seems narrow and outmoded. The principle of taxation according to ability to pay can be interpreted more broadly, as requiring taxes to be levied on income—and indeed on other tax bases such as consumption and wealth—in such a way as to minimize loss of social welfare.

A third defense of the principle of a classical corporate tax system rests on the "benefit" principle that

⁷³See Goode (1951).

taxes should be levied according to the benefit provided by the taxing authorities. It has been argued that corporations enjoy benefits in the form of limited liability, and from government services that are provided more directly, and that some form of taxation of those benefits is appropriate. When the U.S. corporate income tax was introduced in 1909, it was seen, for example, as an "excise tax" on the privilege of limited liability. Defenders of a classical system now usually place little weight on this argument, however. The reason is that it is difficult to establish any direct connection between the benefit of limited liability and the income of a company.

More generally, these arguments of basic principle are now rather unfashionable among economists. Empirical considerations have played a much larger part in recent debates on the appropriate relationship between corporate and individual income tax systems.

The Case Against the Classical (Nonintegrated) System

Compared with a fully integrated system, a classical corporation tax which taxes the equity income of companies at a positive rate may distort incentives in four main ways.

First and most obviously, it acts to discourage businesses from incorporating, and hence from taking advantage of benefits which are associated with the corporate form of organization—such as the benefit of limited liability, which reduces the cost to companies of raising outside capital for expansion.

It should be noted, however, that the discouragement to incorporation applies only insofar as the business is financed by equity. A corporate tax on equity income allows interest payments to the company's creditors to be deducted from the tax base. Hence, when investment is financed at the margin by debt rather than equity, the resulting income bears no tax at the corporate level; the only tax paid on the income is the tax on the lender's interest income. Effectively, then, a classical corporate tax is "integrated" in respect of income from debt-financed projects, and hence may not discourage incorporation when the firm is free to vary its financial structure.

But this point leads to a second adverse incentive effect of a classical corporate tax—namely, that it encourages companies to finance their projects by using debt rather than equity finance. This distortion increases the risk of bankruptcy. It will, therefore, bias companies toward relatively secure investments. Even so, the number of bankruptcies is likely to increase. The productive

assets of companies that go bankrupt need not be lost to the economy; but resources must nevertheless be devoted to redeploying them in new activities.

At the same time, the bias in favor of debt financing gives companies an incentive to disguise the returns they provide to their shareholders, as far as possible, as "interest" payments rather than dividends. Most classical corporation taxes thus require extensive anti-avoidance provisions to limit what may be deducted from the tax base in the form of interest payments.

Third, a classical corporation tax encourages a company to retain its equity earnings rather than distributing them to its shareholders. When dividends are paid, the shareholder is subject to income tax at the appropriate rate. When earnings are retained, the shareholder should benefit, instead, from an increase in the market value of the company. In many countries, that capital gain is not subject to tax; and when there is a tax on capital gains, it is usually levied at a lower effective rate than the income tax on dividends. As a result of this bias in favor of retentions, equity funds may be "trapped" within particular companies rather than allocated between companies in the most efficient manner by financial markets, according to the investment opportunities that the companies face.

Fourth, a classical corporate tax system reduces the incentive to invest, and may therefore inhibit growth.⁷⁴ This criticism can of course be made of fully integrated income tax systems as well, since *any* tax on capital income will tend to discourage investment in the relevant activities. The additional tax that is levied on company income under a classical system, however, represents an additional discouragement.

Combined, these four points represent a powerful case against the classical form of corporate income tax. This case has in practice been an influential one; there has been a general—though not entirely universal—tendency over the last two decades for existing classical systems to be replaced by some form of integration of corporate and individual income taxes. Nevertheless, support among economists for a move toward integration is not universal.

The Case for Retaining a Classical System

The first, and most powerful, argument against integration is that it will generally entail a loss of reve-

⁷⁴Against this, it has sometimes been argued that such a system can have the effect of *increasing* investment. The argument is that if companies are encouraged to retain earnings rather than to distribute them to shareholders, those earnings are more likely to be used for new investment rather than consumption.

nue, compared with what was generated by the classical system that is replaced. This revenue loss must be made up in some way; the corporate tax rate might be increased, or some other taxes might be imposed. In either case, there are likely to be economic costs that must be set against the benefits of integration.

Second, doubts have often been expressed about the empirical significance of particular benefits from integration, such as the reduction in bankruptcies, and in the costs of reorganizing the activities of bankrupt firms. In addition, to the extent that equity is trapped within companies by an existing classical system, the burden of the additional tax that is payable on dividends when those earnings are eventually distributed may already be capitalized into share prices. In this case, much of the benefit of a shift to an integrated system could simply accrue as a windfall gain to existing shareholders.

Recent simulations by the U.S. Treasury of the effects of replacing the present classical system in the United States with some alternative integrated systems do suggest substantial benefits, amounting to up to 0.2 percent of consumption;⁷⁵ but in the present state of the art, such estimates could be quite unreliable.

Finally, some major benefits that may be claimed for a classical system, compared with most integrated systems that have been adopted in practice, are its simplicity and transparency. These features generally make a classical corporate tax system easier to administer than an integrated system. They also avoid most of the severe difficulties that arise in devising an appropriate tax treatment, in an integrated system, of dividends paid or received from abroad. For example, most countries that have adopted "imputation" systems, which provide tax credits to shareholders in respect of corporate tax that has already been paid on the income that they receive in the form of dividends, are reluctant to give such credits for corporate tax that has been paid in a foreign country. As a result, their tax systems may discriminate heavily in favor of domestic, as opposed to foreign, investment. In addition, many countries have adopted integration schemes that allow them to discriminate against foreign shareholders. Thus, integration schemes may discourage both inbound and outbound investment. These biases are much easier to avoid when the corporate tax system has the classical form.

The Mechanics of Integration

DALE CHUA AND JOHN R. KING

- *What is meant by a "fully integrated" system of corporate and personal income taxation?*
- *What problems would arise in implementing such a system?*
- *What methods are available to achieve integration in respect of the taxation of profits distributed by companies to their shareholders?*
- *In what respects do those methods differ?*

The Meaning of "Integration"

The term "integration" has been used in different ways.⁷⁶ Traditionally, "full integration" has been used to denote an arrangement under which the incomes of all entities would be attributed in an appropriate manner to the individuals who are their ultimate owners. The income tax due would then be collected from those owners at the relevant rates, depending on their total incomes.

A scheme of this kind was advocated by the Royal Commission on Taxation in Canada (the Carter Commission) in 1966.⁷⁷ Many economists have seen "full integration" in this sense as an ideal arrangement in principle. But detailed study has generally led to the conclusion that it would be administratively impracticable. The first reason is that there would be an enormous amount of information reporting required: in many economies, a single company may have a very high number of ultimate owners, many of whom will have held shares for only a part of any tax year. Second, attributing retained earnings to different owners is problematic when there are different classes of corporate security holders, with heterogeneous claims such as ordinary shares, preference shares, warrants, options, rights issues, and convertible notes. Third, many company shares are held by other companies. Hence, tracing the ultimate owners can often be difficult. A fourth general difficulty is that if tax were to be levied on shareholders' earnings whether they are retained or distributed by the company, severe liquidity problems could result: shareholders could often be liable to pay large amounts of tax without having received cash with which those liabilities could be met.

⁷⁵See U.S. Department of the Treasury (1992).

⁷⁶For a thorough discussion, see McLure (1979).

⁷⁷See Canada, Royal Commission on Taxation (1967).

No country has tried to apply a full integration scheme of this kind to the taxation of all corporate income. Many countries, however, do effectively integrate company and individual income taxation, along these lines, in the case of small companies with a limited number of owners. For example, in the United States, certain companies with no more than 35 shareholders can qualify (as "Subchapter S" companies) to be taxed in a similar way to partnerships, with their income being allocated directly to their shareholders in the appropriate proportions. A similar effect may be achieved indirectly if the tax system allows small companies to pay out all of their taxable income to their owners in the form of tax-deductible directors' remuneration. This is sometimes referred to as "self-help integration."

While full integration would tax corporate income at the relevant rates for individual shareholders, irrespective of whether that income is distributed or retained within the company, a more limited form of integration is confined to corporate income that is distributed to shareholders rather than retained. Note that this form of integration, confined to the taxation of corporate income that is paid out as dividends, can eliminate the liquidity problem mentioned above. A wide variety of methods may be used to achieve this limited form of integration. The main methods are illustrated below.

Illustrations of Integration Schemes

This section shows, with the aid of a numerical example, how different integration schemes can reduce the overtaxation of corporate income that is inherent in a classical (or separate entity) corporate tax system.⁷⁸

Benchmarks: the classical system and full integration

The tax burden under the classical system, adopted by countries such as the United States, the Netherlands, Luxembourg, and Switzerland, can be illustrated with an example in Table IV.5. Assume that the profits of a company are \$1,000 and that the corporate tax rate is 30 percent. After-tax profits of \$700 are *distributed fully* as dividends. Suppose that the individual shareholders' tax rates are 20 percent and 40 percent. The resulting personal income tax liabilities will be \$140 and \$280, respectively. Hence, the combined corporate and personal tax payment on the same income source is, respectively, \$440 or \$580. To calculate the tax bur-

den, we express the combined payment as a percentage of the original income; hence, the effective tax rate is 44 percent for the lower-taxed individual and 58 percent for the higher-taxed individual. Comparing these effective tax rates with the relevant income tax rate, the "overtaxation rate"⁷⁹ is 120 percent for the low-tax shareholder and 45 percent for the high-tax shareholder.

Table IV.5. Classical System

Corporate level			
i.	Profits before corporate tax	1,000	
ii.	Corporation tax at 30 percent	300	
Shareholder level			
iii.	Personal income tax rate (in percent)	20	40
iv.	Dividend income (i)-(ii)	700	700
v.	Personal income tax (iii)*(iv)	140	280
Combined tax burden			
vi.	Total tax (ii)+(v)	440	580
vii.	Effective tax rate (vi)/(i) (in percent)	44	58
viii.	Overtaxation ((vii)-(iii))/(iii) (in percent)	120	45

If the company decides to *retain all profits*, however, the effective tax rate confronting all shareholders in the short run will be the corporate tax rate of 30 percent. A shareholder facing a 20 percent marginal personal tax rate will then be overtaxed by 50 percent, and one facing 40 percent will be undertaxed by 33.3 percent.⁸⁰ Between the extremes of full distribution and retention of profits are various possible outcomes; each will result in a specific overtaxation or undertaxation for a given shareholder depending on his marginal tax rate.

Full integration of the corporate and personal income tax is the other extreme in the company/shareholder tax spectrum. Under this method, a corporation is treated like a partnership whereby the company's incomes, both distributed *and* retained, are attributed to its shareholders according to their respective holdings: the attribution is then taxed at the shareholder's marginal tax rate. Working through the various steps, the example in Table IV.6 shows that the effective tax rate is also the personal tax rate. Hence, by definition, overtaxation does not exist.

⁷⁹The overtaxation rate is defined as the normalized difference between the effective tax rate and the personal income tax rate, with the latter as the normalization factor.

⁸⁰The return to shareholders, in this instance, accrues in the form of capital gains, which may be taxed at a different rate when realized. This example assumes that such gains are not yet realized by the shareholders.

⁷⁸The methodology used in this section to illustrate the degree of overtaxation in different systems follows that of Cnossen (1993), and Bengt and Robinson (1986).

In particular circumstances, full integration could be achieved in principle by several systems besides the partnership method.⁸¹ One such system would be to abolish the corporate income tax completely and let shareholders pay taxes under the personal income tax on the dividends received plus net accrued capital gains on shares—that is, on a comprehensive income base.⁸² Second, full integration could be achieved straightforwardly in the special case where the personal income tax is levied at a single rate, by levying tax on corporate income at the same rate, while exempting dividends and capital gains on company shares from the personal tax.

Table IV.6. Full Integration

Corporate level			
i.	Profits before corporate tax	1,000	
ii.	Corporation tax at 30 percent	300	
Shareholder level			
iii.	Personal income tax rate (in percent)	20	40
iv.	Attributed profits (i)	1,000	1,000
v.	Personal income tax (iii)*(iv)	200	400
vi.	Corporate withholding tax (ii)	300	300
vii.	Net income tax (v)-(vi)	-100	100
Combined tax burden			
viii.	Total tax (v) or (ii)+(vii)	200	400
ix.	Effective tax rate (viii)/(i) (in percent)	20	40
x.	Overtaxation ((ix)-(iii))/(iii)	—	—
xi.	Tax relief ¹ (in percent)	100	100

¹Tax relief is defined as the difference between the classical overtaxation less overtaxation under the present method, divided by the classical overtaxation.

Partial integration in respect of distributed profits

Between the classical and fully integrated systems are many systems which provide a degree of integration in respect of distributed profits (but not retained earnings). In these systems, relief for the double taxation of dividends can be given either at the corporate or at the shareholder level. The principal methods of providing relief at the corporate level are the dividend-deduction and split-rate systems. The principal methods of providing relief at the shareholder level are the "imputation system" and various schedular methods.⁸³

⁸¹For a detailed discussion, see Benge and Robinson (1986), pp. 39–40.

⁸²This would achieve the same result as the partnership approach to full integration only if capital gains correspond one-to-one with retained earnings.

⁸³See Nott (1982) for a summary of the history and nature of the various double taxation relief systems considered under the partial imputation system.

• *Corporate level. (1) Dividend-deduction system.* Under this system, a fraction of company profits distributed as dividends to shareholders can be deducted against the company's corporate income tax liability.⁸⁴ The proportion of dividends deductible from the corporate tax base varies across countries. How is this system related to the two benchmarks? In the limit, if the full pretax income of a corporation were distributed and there were full deductibility for dividends (as in the case of Greece, for example), then the corporate tax liability would be zero. All taxes would be paid by shareholders, as in the case of a fully integrated system. On the other hand, this system approaches the classical system when the proportion of dividends allowed as a deduction is lowered. In general, the tax burden on the same source of income will be lower than that under a classical system, but higher than under a fully integrated system.⁸⁵

To illustrate, we assume that the authorities provide dividend tax relief at a rate of 50 percent. Table IV.7 shows that a dividend deduction is given at the corporate level (in this example, 50 percent) before corporate tax is levied. Again, assuming full distribution of profits, a shareholder then pays taxes on a dividend income of 850 according to his marginal personal tax rate.

Table IV.7. Dividend-Deduction System

Corporate level			
i.	Profits before corporate tax	1,000	
ii.	Dividend deduction 0.5*(i)	500	
iii.	Profits after deduction (i)-(ii)	500	
iv.	Corporation tax at 30 percent	150	
Shareholder level			
v.	Personal income tax rate (in percent)	20	40
vi.	Dividend income (i)-(iv)	850	850
vii.	Personal income tax (v)*(vi)	170	340
Combined tax burden			
viii.	Total tax (iv)+(vii)	320	490
ix.	Effective tax rate (viii)/(i) (in percent)	32	49
x.	Overtaxation ((ix)-(v))/(v) (in percent)	60	22.5
xi.	Tax relief	50	50

This example is designed to show that relief from double taxation on the dividend is equal to 50 percent of classical overtaxation. Accordingly, the effective tax rate for the low-tax shareholder is 32 percent rather than 20 percent, and that of a high-tax shareholder is 49 percent rather than 40 percent. As is to be ex-

⁸⁴Such a system is used in Greece, Iceland, and Sweden.

⁸⁵See Crossen (1993), p. 8.

pected, the economic burden of overtaxation is lower than under the classical system but higher than under full integration.

(2) *Split-rate system.* Under this system, profits distributed as dividends are taxed at a lower rate than retained earnings or undistributed profits.⁸⁶ If the tax rate differential between distributed profits and retained earnings is small, then the split-rate system approaches the classical system. On the other hand, if the differential is large, then it acts essentially like a tax on undistributed profits.⁸⁷ To show that this system can be designed to be operationally equivalent to the dividend deduction system, we continue to assume that the goal is to provide a 50 percent tax relief measured against overtaxation under the classical system. To achieve the desired level of relief, distributed profits are now taxed at a lower rate of 15 percent. Undistributed or retained profits are taxed at the unchanged rate of 30 percent.

By assuming that all profits are distributed, the contrived example in Table IV.8 shows that the desired level of overtaxation can be easily achieved. In practice, some profits are retained by companies. This complication is ignored in our numerical example, but will add to the overall tax burden in the future as the profits are distributed.

Table IV.8. Split-Rate System

Corporate level			
i. Profits before corporate tax		1,000	
ii. Corporation tax on distributed profits at 15 percent		150	
Shareholder level			
iii. Personal income tax rate (in percent)	20	40	
iv. Dividend income (i)–(ii)	850	850	
v. Personal income tax (iii)•(iv)	170	340	
Combined tax burden			
vi. Total tax (ii)•(v)	320	490	
vii. Effective tax rate (vi)/(i) (in percent)	32	49	
viii. Overtaxation ((vii)–(iii))/(iii) (in percent)	60	22.5	
ix. Tax relief (in percent)	50	50	

• *Shareholder level.* (1) *Imputation system.* Perhaps the most common approach to providing relief from double taxation of dividend income is a method generally referred to as the “imputation system.” This

method gives shareholders a credit for taxes paid by the company under the corporate income tax; this credit can be used as an offset against their personal income tax liability on dividends.⁸⁸

The imputation system acknowledges that corporate income paid out as dividends has already been taxed once at the corporate level; therefore, an explicit relief is given against the personal income tax at the shareholder level. The level of tax relief given to shareholders is commonly known as the rate of imputation. Under this system, the personal income tax base for the shareholder is the sum of dividend received plus the tax credit, that is, the grossed-up value of the dividend. The marginal personal tax rate is then applied to this grossed-up value to derive the gross income tax payable. The corporate tax is then credited against the gross tax of the shareholder, and the balance is the net tax payable (or the amount refundable). In general, if the shareholder's marginal tax rate is higher than the imputation rate, then additional taxes are payable; but he will receive a refund if the imputation rate is higher than his marginal tax rate.

We illustrate the mechanics of this system in Table IV.9. For comparison with the cases shown above, only partial relief (50 percent) is provided; to achieve the stated goal, the net dividend is grossed up by a factor of 3/14.⁸⁹

Table IV.9. Imputation System

Corporate level			
i. Profits before corporate tax		1,000	
ii. Corporation tax at 30 percent		300	
Shareholder level			
iii. Personal income tax rate (in percent)	20	40	
iv. Net dividend income (i)–(ii)	700	700	
v. Imputed corporate tax (3/14)•(iv)	150	150	
vi. Grossed-up income (iv)•(v)	850	850	
vii. Personal income tax (iii)–(vi)	170	340	
viii. Tax credit (v)	150	150	
ix. Net income tax (vii)–(viii)	20	190	
Combined tax burden			
x. Total tax (ii)•(ix)	320	490	
xi. Effective tax rate (x)/(i) (in percent)	32	49	
xii. Overtaxation ((xi)–(iii))/(iii) (in percent)	60	22.5	
xiii. Tax relief (in percent)	50	50	

⁸⁸Australia, Finland, France, Germany, Italy, New Zealand, Norway, and the United Kingdom are several OECD countries that adopt this system. Malaysia and Singapore, among the developing countries, also adopt this system.

⁸⁹Using the contrived tax relief of 50 percent and working backward using the steps indicated in Table IV.9, the gross-up factor can easily be shown to be 3/14.

(2) *Schedular methods.* Other methods of providing relief from double taxation of dividends, at the shareholder level, are classed collectively as schedular methods. One such approach is the separate tax method, sometimes called the dividend-exemption system. Before distribution, corporate source income is taxed at the corporate rate. Distributed dividends are then partially taxed and partially exempt under a personal income tax which taxes dividend income at a lower preferential but usually flat rate.⁹⁰

Another system, widely known as the tax credit method,⁹¹ is very similar to the imputation system method in that it provides a credit to shareholders against their personal income tax, usually specified as some proportion of dividends received. It differs, however, from the imputation system in that (1) the tax credit is available to the shareholder whether or not the corporate tax is actually levied; (2) the net dividend received is not grossed up; and (3) in general, no refund is given if the tax credit exceeds the gross income tax liability.

Differences Between Integration Methods

As the above numerical illustrations show, the same effective rate of tax on corporate income that is distributed to particular shareholders can be achieved by a wide variety of different schemes. But in many other respects, the implications of those schemes are quite different.

A first, obvious distinction is between schemes which attempt to eliminate the double taxation of dividend income entirely, and those that do so only partially.

A second important distinction is between schemes that levy tax on distributed corporate income at different rates according to the marginal income tax rate of the shareholder, and those that effectively apply a single rate to corporate income.

A third practical difference between integration systems for distributed income concerns the extent to which the benefits of any tax incentives (or "tax preferences") that are provided to companies, such as accelerated depreciation and investment tax credits, can be passed on to shareholders when the income is distributed. Suppose, for example, that a company earns distributable profits of 100, but preferences reduce its taxable profits to 50. When the profits are fully distributed, some integration systems would effectively credit the shareholders with corporate tax on the full amount

of the distribution—that is, on 100; others would limit the credit to the profits of 50 on which corporate tax had actually been paid.

In a similar way, there are important practical differences between integration schemes in respect of their implications for income that is distributed to foreign shareholders and the foreign income of companies that is distributed domestically. For example, dividend-deduction and split-rate systems provide relief for double taxation of dividends, at the corporate level, irrespective of whether the shareholders are resident or non-resident. On the other hand, under imputation systems that provide relief at the shareholder level, that relief can be confined to resident shareholders. This basic difference may be modified in practice by bilateral treaties to avoid double taxation. But it is clear that the choice of an integration system that provides relief at the shareholder level, rather than the company level, will strengthen a government's bargaining position in negotiating such treaties. International considerations of this kind have often been paramount in determining different countries' choices between alternative integration methods.

Taxation of Capital Gains

JOHN R. KING

- *In what ways do tax systems vary in their treatment of capital gains?*
- *What are the arguments for taxing capital gains in a different way from ordinary income?*
- *What are the main features of capital gains tax structures in different countries?*
- *What are the main difficulties that arise in imposing tax on capital gains?*

Capital Gains and Business Income Taxation

The Schanz-Haig-Simons comprehensive measure of income during a given period would include, on a par with other types of income, the change in value of all the capital assets and liabilities of an individual or business during that period. Personal and corporate income tax systems, however, treat many types of capital gains in a different way from other types of income, by applying specific provisions in the case of particular kinds of gain, often exempting them from tax or subjecting them to tax at different rates.

⁹⁰Austria adopts such a system. Turkey also adopts such a system, but fully exempts dividends from taxes.

⁹¹This system is operative in Canada and Spain.

Some of these special provisions may differ according to whether the gains accrue to companies on the one hand, or to individuals on the other. Capital gains taxes at both levels are relevant to the taxation of corporate income; in the larger OECD economies, a major part of individuals' capital gains consist of gains on company shares, and these gains often rival dividends as a means by which individuals derive returns from their ownership of corporate equity.

In practice, it is much more difficult to compare the treatment of capital gains in different countries' tax systems than to compare other aspects of corporate taxes, such as depreciation allowances or loss carryforward. Capital gains or losses can arise on many different kinds of assets (or liabilities), owned by different kinds of economic agents; and countries differ in respect of whether particular types of gains would be treated as income, or as "capital gains" that might be subject to special treatment under either the regular income tax or a separate capital gains tax. Three examples of these differences are worth noting.

First, there is often an important distinction between assets that are depreciable for tax purposes and those that are not. In the case of depreciable assets, many income tax systems provide that depreciation allowances should be "recaptured" (or recovered in the form of a "balancing charge") when the asset is sold for more than its written-down value for tax purposes. With a system of this kind, the gain realized on disposal of a depreciable asset is, thus, treated as income. But separate provisions in the tax law are applied to nondepreciable assets such as land and securities.

Second, what is treated as a capital gain that may be subject to special rules also depends on the valuation conventions that are applied in measuring assets and liabilities, and these often vary in different countries' tax systems. For example, if liabilities that are denominated in foreign exchange are shown in the balance sheet at current market values, and changes in those values are reflected in the profit and loss account in each accounting period, the exchange gain or loss accruing in each period may automatically be taxed as income. On the other hand, if the liability is carried in the books at historical cost, a gain or loss will be shown as "realized" only when the loan is repaid. The issue then arises whether that realized gain or loss is to be treated as ordinary income or as capital gain.

Third, the same kind of gain can be treated in different ways, according to the nature of the economic agent to whom it accrues. For example, when individuals or businesses trade in property or securities, they are generally subject to income tax on the aggregate

gain or loss that accrues in each period. The same gains or losses are often treated differently, however, when they arise in the hands of others, for whom they are in the nature of "incidental" revenues.

In comparing different countries' tax systems, therefore, it is not sufficient to examine the particular provisions that they contain relating to capital gains. It is also necessary to determine how in practice they draw the line between capital gains and "ordinary" income.

The Case for Differential Taxation of Capital Gains and Other Income

Historically, differential taxation of income and accrued capital gains arose in many European countries from an underlying concept of taxable income as a flow of services from specific capital sources, separate and distinct from any changes to the value of those sources themselves. Under this income concept, capital gains were not subject to tax. Differential tax treatment can, however, also claim some theoretical support from more modern concepts of income such as that of Hicks, which would exclude from the income measure certain gains and losses that are in the nature of unanticipated windfalls.

As the concept of "comprehensive" income gained support as an ideal standard for an income tax base, the practical difficulties of measuring capital gains as they accrue in each income period provided further arguments for differentiation of their tax treatment from that of other forms of income. Valuation of all the assets of each individual or business at the appropriate market prices, at the end of every period, appears generally impracticable. In the absence of such valuations, capital gains could only be subjected to tax when they are "realized" in the disposal of the asset. A supplementary, practical argument in favor of taxation of gains at the time of realization, rather than on an accruals basis, is that the disposal of an asset by way of sale generates cash that can be used to satisfy the tax liability. Taxing gains on an accruals basis, on the other hand, may result in severe liquidity problems for the individual or business concerned.

Postponement of the tax liability on gains to the point at which the gains are realized—which is generally at the discretion of the taxpayer—constitutes differential treatment of accrued capital gains relative to other income that is received in the form of cash. It also gives rise to arguments for further differentiation. In particular, when income in a particular period is subject to progressive rates of tax, it can be argued that it would be inappropriate to tax the gains *realized* in that period as a "top slice" of income—since those

gains may have accrued over many earlier periods and are "bunched" when realized.

A rather different argument that has sometimes been used in favor of differential taxation of (nominal) capital gains is that, under conditions of inflation, they are a distorted reflection of the *real* gains that would appropriately be included in a comprehensive measure of income. What is measured as a nominal gain may correspond to a much smaller real gain, or even to a loss in real terms.

Capital Gains Tax Structures

In general, when capital gains are subject to tax as they accrue, they are taxed as ordinary income. Special provisions usually apply, however, when gains are taxed at the time of realization.

Among OECD countries, there has been a general—though by no means uniform—trend in recent decades toward bringing gains accruing over a period of several years within the tax net.⁹² The U.S. provisions date from the introduction of the Federal income tax in 1913, though they have been changed frequently since that time.⁹³ Provisions relating to long-term gains were introduced in Japan in 1946; in Denmark, in 1958; in Sweden, Portugal, and the United Kingdom, in the 1960s; in Canada, France, Ireland, and Spain, in the 1970s; and in Australia, in the 1980s. In many of these cases, gains realized over short periods had been subjected to tax at an earlier date. The main justification for imposing a tax on capital gains has been the equity argument, that such gains are equivalent to other forms of income in their effect on "ability to pay." In addition, however, an important reason for the spread of capital gains provisions has been the need to protect income tax revenues from erosion through tax avoidance, in the form of transactions that result in the conversion of taxable ordinary income into nontaxable gains.

These special provisions sometimes take the form of a capital gains tax that is separate from the normal income tax (as in Ireland, Italy, and the United Kingdom, among OECD countries). More commonly, however, they are part of the income tax law. This section summarizes the most common special provisions that apply.

Chargeable gains

Capital gains that are taxable under the provisions generally consist of those arising on the disposal of real property and financial assets, such as company

shares. In some countries, the provisions apply to only certain assets in these categories. Gains on particular assets, such as owner-occupied residences and government securities, are often exempted.

Occasion for a tax charge

The typical "realization" for tax purposes is the disposal of an asset for consideration. Other events may, however, be treated as "deemed realizations" for tax purposes—for example, transfers by way of gift, or upon death of the owner. On the other hand, some countries allow gains of certain sorts, or in certain circumstances, to be "rolled over" so that the tax charge does not crystallize until a later date.

Tax rates

Often, when realized capital gains are subject to tax, they are taxed at different rates from those that are applied to ordinary income. In the case of gains realized by companies, Belgium, France, and Ireland apply special rates. In all these cases, the rate differs according to the length of time that the asset has been held. In the case of gains realized by individuals, many more countries apply separate rates—again, often varying according to the holding period—or include only some fraction of the gain in the amount that is taxed at ordinary income tax rates.

Holding period criteria

As noted above, many countries treat realized gains differently according to the holding period over which the gain has accrued. When this distinction is made, gains realized on assets that have been held for longer periods are treated more favorably than short-term, "speculative" gains. In some cases, gains are exempted altogether if the asset has been held for longer than a specified period.

Capital losses

Most countries allow realized capital losses to be offset against gains in the same year. There are, however, considerable variations in the scope allowed for carrying excess losses forward (or backward), and in the possibility of offsetting them against other forms of income.

Thresholds

Capital gains realized by individuals are commonly taxable only above a certain annual (or lifetime) threshold, even in those countries where the gains are subject to the regular income tax rather than to a separate capital gains tax. The main reason that has been given for such a threshold is the administrative

⁹²For a comparison of capital gains tax structures in OECD countries, see OECD (1988).

⁹³See David (1968); and Wetzler (1977).

difficulty, and often disproportionate cost, of assessing tax on a large number of individual gains. In many countries, however—particularly those with “self-assessment” systems, such as the United States—no such threshold applies.

Inflation adjustment

Since the 1970s, a number of countries have introduced an inflation adjustment into their capital gains provisions, increasing the “acquisition cost” used in calculating the realized gain according to the increase in some specified price index since the date of acquisition. Among OECD countries, the list of those that index corporate capital gains for tax purposes now includes Austria (in cases where the asset has been held for at least 19 months), Ireland, Portugal, and the United Kingdom. Although conceptually straightforward, indexation of acquisition cost may result in formidable administrative complexities. For example, when a holding of a particular class of asset (such as a particular class of share in a particular company) has been built up over a period of years, the holding may be “pooled” and effectively treated as a single asset in an unindexed system; when indexation is introduced, however, detailed rules may become necessary to assign particular disposals from the pool to particular acquisition dates.

The Problems of Capital Gains Taxes

Underlying these widely varying tax structures for capital gains are a number of common problems.

The first is the difficulty of drawing the appropriate boundaries between accruing gains that are to be treated as income, gains that should be taxed but, for practical reasons, must be taxed on a realization basis under special provisions, and gains that should not be taxed at all. Since financial markets will usually try to exploit any differences in the tax treatment of similar types of transaction, the boundaries may need to be continuously shifted. For example, in recent years, countries such as the United States and the United Kingdom have found it necessary to devise schemes to bring into tax as ordinary income the “gain” that accrues over time on a security that pays little or no interest, but that is issued instead at a deep discount.

A second difficulty that arises, when gains are taxed at the time of realization, is that this tax treatment may tend to “lock in” the investor, discouraging him from disposing of the asset and hence crystallizing the tax charge. Empirical estimates of the magnitude of this lock-in effect that have been made in the United States differ quite widely, but there is no doubt that it can be

significant in particular circumstances. It is worth noting that holding onto an asset will generally only *postpone* the tax charge, and not eliminate it entirely. The lock-in effect may, however, be greatly magnified if the taxpayer is able to reduce the tax charge by holding onto the asset until retirement, or to escape the charge completely by holding it until he dies.

Rollover provisions for particular types of transactions are designed to minimize the potential lock-in effect. But they do so by reducing the effective rate of tax on accrued capital gains, and hence increasing the extent of any distortion and unfairness that arises from the differential taxation of capital gains and other forms of income.

The third general difficulty arises from inflation. As noted above, the appropriate adjustments to take account of inflation are conceptually straightforward, and several countries have introduced such adjustments in their capital gains tax regimes in recent years. These adjustments weaken the case for certain other common capital gains tax provisions (such as reduced tax rates for all realized gains, reduced rates for assets that have been held for a long period, and partial inclusion of gains in the total of taxable income) that have often been justified as rough-and-ready methods of taking account of the impact of inflation. When an indexed treatment, however, is introduced for capital gains but not for other forms of income, such as interest income, whose measurement is similarly affected by inflation, new anomalies and distortions can arise in the tax system.

Debt and Equity Financing

JOHN R. KING

- *Do corporate and personal income tax systems generally favor debt over equity financing of companies?*
- *Does a tax on dividend payments encourage companies to retain earnings?*
- *How could the tax system be made “neutral” in its effect on a company’s choice between alternative methods of finance?*

The Tax Treatment of Interest and Dividends

Corporate income tax systems treat interest and dividends in different ways. As a result, they affect the incentives that companies face to finance their

investments using debt on the one hand, or equity on the other.

In almost all existing corporate tax systems, the income of a company is measured for tax purposes from the standpoint of its owners. Payments of interest to the company's creditors are, therefore, allowed as a deduction. (As noted below, however, deductibility of interest is often subject to certain qualifications or restrictions.)

As described above, the treatment of dividends paid by a company varies much more widely. In Greece, for example, dividend payments are deductible in full, on a par with interest payments. In certain other countries (such as Iceland, Spain, and Sweden, among OECD countries), a proportion of dividends is deductible from taxable profits. In the majority of cases, however, the payment of dividends does not directly affect the amount of a company's profits that is subject to tax.

This suggests that corporate tax systems normally favor the use of debt finance, where the return to the provider of funds takes the form of interest payments, over equity, where the return is provided in the form of dividends. Before coming to that conclusion, however, it is necessary to consider also the way in which interest and dividends are taxed in the hands of the recipient. A dividend deduction under the corporate income tax is one way in which double taxation of distributed profits may be relieved, but other methods of achieving this same result—such as crediting corporate tax paid on distributed profits against the shareholder's liability to tax on the dividend, or excluding a part of the dividend from income that is liable to tax at the shareholder level—are rather more common. The individual saver's choice to supply funds to the company as debt or equity finance will be influenced by many nontax considerations; but, insofar as tax is relevant, it is the *total* tax charge on the return to those two sources of funds that matters.

Analysis of the effect of company and personal tax systems on the incentive for companies to finance themselves using debt or equity is, therefore, complex. In most systems, however, the total tax charge on interest is lower than that on dividends.

The Boundary Between Interest and Dividend Payments

When interest payments by companies are treated for tax purposes more favorably than dividend payments, companies have an incentive to disguise the payment of a return to its owners as "interest." Provisions in the tax law commonly seek to limit this form

of avoidance, in a variety of ways. For example, a deduction for loan interest payments may be allowed only when some of the following conditions are satisfied:

- the loan has been incurred for taxable business purposes;
- the loan has not been obtained from shareholders, or other related parties;
- the loan interest is not "excessive"; and
- the amount of interest payable under the loan contract is not related to the profits of the company, or some other measure of its performance.

In recent years, tax authorities of a number of countries have become increasingly concerned with the "thin capitalization" of certain foreign subsidiary companies operating in their territories, when the ratio of equity to funds directly or indirectly lent by other companies in the same group falls short of the proportion that could be deemed normal on an arm's length basis. The first line of defense against thin capitalization should be a withholding tax on interest paid to foreigners, but other measures may be taken as well. Some countries (such as Belgium and Italy) judge the extent of thin capitalization subjectively, on a case-by-case basis. Other countries (such as Australia, Canada, the United States, Spain, France, and Japan) have introduced an objective criterion into their legislation, in the form of a maximum debt/equity ratio which certain types of companies must not exceed if their payments of debt interest are to be allowed in full as a deduction. For example, under regulations introduced in the United States at the end of 1989, any excess of the debt/equity ratio above 1.5:1 at the end of the year may threaten the deductibility of interest.

Anti-avoidance rules of this kind may be difficult to administer effectively. It is also worth noting that they may, occasionally, create new opportunities for abuse. For example, in the United Kingdom in the early 1980s, certain companies with no current taxable profits found it advantageous to have their interest payments classified for tax purposes as dividends. By including in the loan contract a clear (but trivial) relationship between the amount of interest payable and the profits of the company, they were able to exploit the "anti-avoidance" provisions in the income tax law to achieve this result.

Alternative Views of Equity Finance

From the more favorable treatment of interest than of dividend payments in most countries' corporate income tax systems, it does not necessarily follow that

those systems result in a tax bias toward debt financing of new investments. Whether they do so has recently been a matter of controversy.

The basic difficulty arises from a company being able to obtain equity finance at a particular point in time in different ways—by issuing *new* equity, or by retaining earnings that would otherwise have been used to pay dividends (or perhaps to repurchase shares, in countries where this is permitted under company law). When earnings are retained, the market value of the company will increase as a result of the increase in its assets. That reward to the shareholder, in the form of an accrued capital gain, will generally be taxed at a much lower effective rate than the dividends that it replaces, and in many countries, it may not be taxed at all.

Traditionally, it was usually assumed that the tax treatment of dividends is relevant to the cost of equity finance to the company, whether that finance is obtained in the form of new share issues or retained earnings, because any tax charge on dividends must be incurred eventually by the equity-holder. But a “new view” of dividend taxation, which has emerged in academic work since the early 1970s, has challenged this assumption.⁹⁴

A simple example can illustrate the basis of the “new view.” Suppose that a company finances a one-period investment project, costing 100 and yielding a return of 10 percent, by retaining earnings that would otherwise have been paid as dividends. If its shareholders have a marginal income tax rate of 30 percent, the opportunity cost to them is 70 in after-tax dividends at the beginning of the period. At the end of the period, the company can distribute to its shareholders the original 100, plus the return of 10, less corporate tax paid on that return (say at 40 percent)—that is, a total of 106. Shareholders will be liable to tax at 30 percent on these dividends, leaving them a net amount of 74.2 at the end of the period. This represents a return of exactly 6 percent on their initial “investment” of 70. Thus, the return to the shareholders is affected *only* by the corporate tax paid on the yield of the investment; the tax that they pay on dividends is irrelevant.

According to this view, the tax treatment of dividends only affects the cost of *new* equity. Once new shares have been issued, equity is “trapped” within the company: the tax charge on its dividend return can only be postponed, not avoided altogether. A corollary is that the tax charge should be capitalized in the mar-

ket value of the company’s shares, which may therefore fall below the value of its assets. The new view implies that the cost of equity finance in the form of retained earnings will be substantially below the cost of new equity, particularly in the case of corporate tax systems of the classical form. Retained earnings should, thus, be the preferred source of equity finance for new investment; and the degree to which the tax system favors debt over equity should be much smaller than would be suggested by a simple comparison of the tax treatments of interest and dividends. Since retained earnings are, in practice, a much more important source of funds for investment than new share issues, this issue is of considerable importance in making a judgment of the extent to which different tax systems provide incentives for companies to finance themselves using debt rather than equity.

The new view rests on some strong assumptions—for instance, that the company cannot repurchase its own shares. In principle, it is open to empirical testing; and on the whole, the tests that have been conducted so far do not support the new view, at least in its pure form. One possible reason is that accountants are well paid to find ways of extracting “trapped” equity from companies without incurring a tax charge.

Thus, the general consensus at present is that differences in the tax treatment of interest and dividends *do* affect companies’ choices between debt and equity financing, not only when available retained earnings are insufficient (for instance, in the case of new or rapidly growing companies), but also in the more general case where equity funds may be obtained by the company from retained earnings as well as from new share issues.

Alternative Approaches to Neutrality Between Debt and Equity Financing

Tax discrimination between debt and equity financing matters, for two reasons. First, such discrimination creates opportunities for tax avoidance, which may have serious consequences both for government revenues and for the equity of the tax system. As financial systems become increasingly adept at devising new instruments to exploit any such opportunities, these consequences may become increasingly serious in the future. Second, an encouragement to debt financing may have important real effects on company behavior. As debt/equity ratios rise, companies’ investment decisions are likely to be affected increasingly by considerations of risk; and as the incidence of bankruptcy increases, costs are imposed on the economy in the form of resources that need to be devoted to reorganizing the activities of those companies that fall into bank-

⁹⁴See Zodrow (1991).

ruptcy. Neutrality in the treatment of debt and equity financing is, thus, a desirable objective for an income tax system.

Two approaches to a more neutral system could be taken. The treatment of equity finance could be brought into line with the existing treatment of debt finance; or the treatment of debt could be brought into line with that of equity. Several alternative schemes of these two general types have been adopted or proposed.

Aligning the treatment of equity with that of debt

In practice, the approach that many countries have taken to removing or reducing tax discrimination between debt and equity finance has been through integration schemes of the kind considered in detail above. Since integration applies in practice only to corporate equity income that is distributed as dividends, this approach does not remove the distinction between debt and equity finance entirely; the return on debt is taxed (or relieved) when it *accrues* in the form of interest; the return on equity, on the other hand, is taxed only when it is *paid* in the form of dividends.

An alternative approach, which has recently been suggested by the Institute of Fiscal Studies, would put equity on a par with debt in the corporate income tax by giving an "allowance for corporate equity" (ACE), which would consist of an imputed interest charge on the company's equity.⁹⁵ If the interest charge could be set at the appropriate level—which would correspond, in principle, to the opportunity cost of funds provided by the company's shareholders—this approach would confine the corporate income tax to pure profits, and hence would not distort the company's decisions. Although this approach has attracted some interest since it was first proposed in 1991, no countries have adopted it in practice.

Aligning the treatment of debt with that of equity

A proposal with a rather longer history—but one which has also not been adopted in practice, except for certain special mining taxes in a few countries—is a "cash flow corporate tax" which (in one particular form) would allow no deduction for either dividends or interest.⁹⁶ Combined with an immediate deduction for expenditures by the company on capital assets, this system would also have the effect of confining the corporate tax charge to pure profits and would not distort the choice between debt and equity, provided that the recipients of interest and dividends were subject to tax in exactly the same way.

⁹⁵See Institute for Fiscal Studies (1991).

⁹⁶See Shome and Schutte (1993).

Removal of the present corporate deduction for interest payments is also the central feature of the "comprehensive business income tax" that has recently been proposed by the U.S. Treasury as a method of removing discrimination between debt and equity financing.⁹⁷ In this proposal, tax paid by the company would be the *final* tax charge on company income, irrespective of whether the income is retained, paid to shareholders as dividends, or paid to bondholders as interest.

The Concept of Cost of Capital: Marginal Effective Tax Rate on Investment

DALE CHUA

- *What is a marginal effective tax on an investment?*
- *What affects the marginal effective tax on investment?*
- *A country study: What observations can be drawn from a matrix of marginal effective tax calculation?*

In the course of doing business, a profit-maximizing firm acquires physical and intangible capital goods as new investment to replace or augment its existing, depreciated capital stock. The rule that guides the firm is to invest to the point where the incremental unit of capital provides a stream of real returns that is just enough to cover *all* costs, including taxes, associated with that investment. In adopting this rule, a profit-maximizing firm should invest to the point where the marginal benefit of a dollar's worth of capital per period is equal to the cost of holding a dollar of capital for that period. Mathematically, in equilibrium, a profit-maximizing firm will set the present value of its expected future earnings from the last unit of its investment, less the accompanying future tax liability, equal to the cost it expects to pay for that unit of investment, less the present value of any capital allowance it expects to receive from using the investment. The cost associated with the holding of a dollar of capital per period is known as the cost of capital.

In a world without taxes, the cost of capital consists of two basic components. The first is the cost of finance, which arises because capital expenditure must be paid for with funds, either borrowed or through eq-

⁹⁷"Report of the Department of the Treasury on Integration of the Individual and Corporate Tax Systems," Taxing Business Income Once, U.S. Government Printing Office, U.S. Department of the Treasury (January 1992); for a critique, see Sunley (1992).

uity participation. The second is the capital consumption cost, which arises because a newly purchased capital stock will, over time, result in a loss of value due to depreciation and technical obsolescence. Accounting for such costs will ensure that the return to shareholders is also maximized. There is no need to differentiate between the before-tax and after-tax rate of return on investment since they will be identical. With taxes, however, a firm will need to consider tax-related factors as they impinge on the cost of finance and the capital consumption cost. The tax factor, often an important consideration, thus constitutes an additional component in the cost of capital.

In practice, capital income is taxed in many different ways. Profits before distribution are taxed at the corporate level under the corporate income tax. Distributed profits are taxed as dividends at the shareholder level under the personal income tax, which may or may not provide relief for taxes paid at the corporate level. In addition, other taxes such as property tax, special levies, and royalties will also alter the after-tax income stream received by shareholders. These taxes, which are frequently not designed with investment neutrality as an objective, will distort investment behavior and, in so doing, create inefficiencies in resource allocation. In what follows, we introduce a concept to measure such distortions.

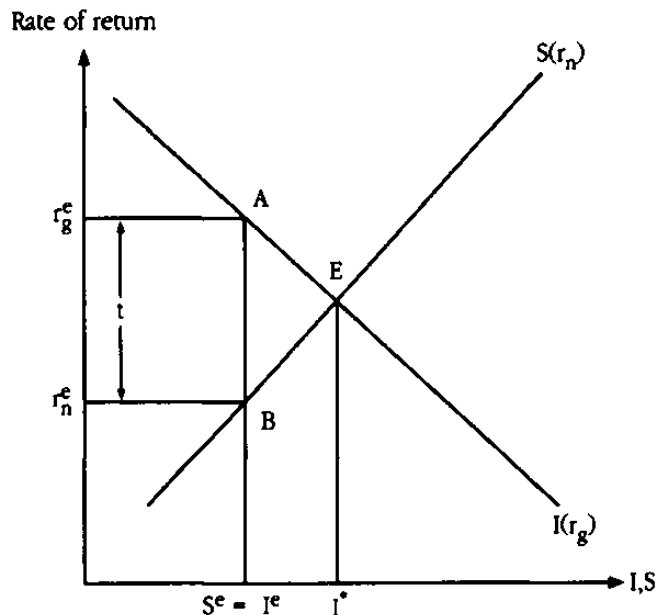
Definition of the Marginal Effective Tax Rate

In a nutshell, the marginal effective tax rate (METR) measures distortions that are created by the taxation of capital income imposed at the corporate and personal levels on marginal investments. The latter are, by definition, those whose return is just sufficient to cover costs, including tax-induced costs. Because the distortions are created by the corporate and personal income taxes, the METR comprises the sum of the distortions created by each tax. Conceptually, therefore, the total distortion can be separated into a marginal effective corporate tax (induced by the corporate tax) and a marginal effective personal income tax (induced by the personal income tax). The METR is also defined as the difference between the before-tax (gross) rate of return on a marginal investment and the after-tax (net) rate of return on the savings that is used to finance that same marginal unit of investment.⁹⁸

A measure that quantifies the impact of tax-induced distortion on investment, if judiciously applied, would

⁹⁸A rich literature comprising at least two approaches has flourished since the 1980s. One well-known approach is discussed in King and Fullerton (1984). Another approach, developed particularly for a small, open economy can be found in Boadway (1987), pp. 60–105.

Figure IV. 2. Capital Market Equilibrium with Taxes



yield a matrix of METR statistics that would allow a systematic assessment of investment distortions for various types of investment goods (such as machinery, buildings, and inventories) across various sectors in the economy (such as manufacturing, services, agriculture, and mining). In the 1980s, this concept was widely applied in virtually all OECD countries as well as in many developing countries, and provided policymakers with a useful tool for tax reform strategies.

The idea of METR can best be illustrated with a diagram.⁹⁹ Figure IV.2 shows a standard investment market for a particular class of capital goods. The investment schedule is a downward-sloping function dependent upon the before-tax rate of return r_g . This rate can be interpreted as the return to the economy since it comprises the after-tax return to the firm and the tax revenue to the government. The saving schedule depicts the level of saving that will be forthcoming for a given after-tax rate of return r_n . As an after-tax return to savers (as a group), this rate can be viewed as the opportunity cost to savers for abstaining from present consumption in an effort to maximize their intertemporal utility. Both r_g and r_n are measured in real terms.

In a world without taxes, a profit-maximizing firm will invest to the point where the return on investment is just equal to the cost of borrowing. As shown in Fig-

⁹⁹This section follows Boadway (1987). For ease of exposition, the material presented here does not include the treatment of a small open economy. For a full discussion, see pp. 61–63.

ure IV.2, an equilibrium is obtained at I' where r_g equals r_n . The corporate taxes on capital income, by distorting economic behavior, however, will cause a firm to alter its investment behavior to maximize its after-tax profits. In a similar way, the personal income tax will alter a household's saving behavior to maximize its intertemporal utility. Assume that the tax-affected equilibrium is observed at I'' . The before-tax rate of return to investment r_g^e and the after-tax rate of return to savers r_n^e are now separated by a tax wedge. The wedge measured by the vertical distance t can be interpreted as the amount in taxes collected by way of corporate and personal income taxes on the marginal investment unit.¹⁰⁰ By expressing this wedge t as a proportion of the before-tax rate of return r_g^e , one obtains the METR. It is also evident (in Figure IV.2) that the distortion creates an efficiency cost that is equal to the tax burden triangle ABE.

In Figure IV.2, the tax system penalizes investment resulting in a positive tax wedge t . A possible reason may be that if the capital is depreciable, but the present value of tax depreciation is less than expensing, then the economic cost of capital incurred in doing business is not adequately deducted as an expense. In this case, a firm maximizing its after-tax profits will choose to use less capital and, accordingly, invest less. This is suboptimal from society's viewpoint. In other cases, however, it is equally possible for a tax system to subsidize capital investment resulting in overinvestment. This may happen if the immediate tax saving associated with a generous investment tax allowance exceeds, in a present value sense, the future tax burden on the income derived from such an investment.

What Affects the Cost of Capital and the METR?

In what specific ways do taxes affect the METR measure? First, consider the financing requirement of a firm. To pay for new capital investment, a firm can raise funds by issuing debt (via bonds), through equity (via shares or retained earnings), or through some combination of debt and equity. Most corporate tax systems provide full deductibility for the interest cost of debt financing. As a result, the actual cost of debt financing to a firm is the risk-adjusted real market rate less deductions allowed under the corporate income tax. On the other hand, funds raised through equity are usually not deductible in the same way. Since the cost of finance is one factor in determining the cost of capi-

tal, tax codes that affect the financing operation of a firm will directly impact on the METR via the cost of capital.

Second, consider the cost of depreciation for capital goods. Unlike labor and raw materials, immediate expensing for a capital good is generally disallowed because its economic life is generally longer than one period. Longer-lived physical assets, however, do depreciate in value through repeated use. To provide for depreciation costs, all corporate systems allow some depreciation charges to be claimed against revenue. But the present value of deductible depreciation allowances rarely equals expensing, thereby causing a firm to bear part of the tax-induced cost of investment. To minimize this tax-induced cost, a firm will undertake less investment. On the other hand, if the depreciation allowances are overly generous, then the tax system will effectively be subsidizing investment at the margin. Hence, tax depreciation provisions can give a firm either insufficient or excessive incentive to invest in new capital. In either case, a tax wedge will be created. In general, other things being equal, the greater the deviation between the economic cost of depreciation and the tax depreciation allowance, the greater will be the distortion and, accordingly, a higher METR will be generated.

Third, the METR is also affected by the return to savers via the personal income tax. In equilibrium, the after-tax return to holding securities must be the same regardless of the kind of financial claims held. By affecting the after-tax return to a saver, the marginal personal tax rate will also have an impact on the METR statistic. If there were no personal income tax on returns to savers, then more lending would be forthcoming. On the other hand, a higher marginal personal tax on capital income will be more distortive as it lowers the price of present consumption and, other things being equal, will result in a larger METR.

Apart from tax factors, inflation can also have an impact on the cost of capital measure. This is due to the historical cost accounting method of valuing assets and depreciation charges for tax purposes.¹⁰¹ For instance, without indexation for inflation, future depreciation deductions will be less valuable to a firm. When inflation is high, a firm is penalized for having invested in long-lived capital because inflation erodes the real value of future tax depreciation from those investments. Therefore, inflation undermines the ability of a firm to recover the real economic cost of using its capital. On the other hand, a highly levered firm that fi-

¹⁰⁰Technically, this wedge can be further broken down into a marginal effective corporate tax wedge, which measures the distortion induced by the corporate tax system, and a marginal effective personal tax wedge, which measures the distortion induced by the personal income tax system.

¹⁰¹For a more detailed treatment of inflation, see section on inflation adjustment above.

nances its operation with nominal debt will benefit from high inflation because the firm will be able to write off as costs the fall in the real value of the principal due to inflation. So, inflation increases the value of nominal interest deductions. Thus, without indexation, inflation can either increase or decrease the true economic cost of investment. A firm wanting to minimize cost (maximize profits) will react by undertaking less (more) investment if it perceives that the loss from tax savings on future depreciation is greater (smaller) than the gains from nominal interest deduction. Acting through the cost of capital, inflation, like a tax parameter, will also influence the METR. The direction in which inflation will affect the METR is not possible to deduce theoretically, given the two opposite forces at work.

Computing the METR: Simple Analytics and an Empirical Application

The relationship among the various factors affecting the cost of capital (and therefore the METR), discussed above in general terms, is illustrated here using a simple analytical framework. A representative firm's investment decisions in each period are guided by the principle of maximizing the net present value of returns to its investments. The firm will invest to the point where the real rate of return, R , of the marginal dollar of investment for one period is equal to its costs in that period. In a world without taxes, the costs to the firm will comprise (a) the real cost of financing the marginal dollar of investment, $r - \pi$, where r is the nominal cost of financing and π the expected rate of inflation; and (b) the real economic depreciation, δ . If this investment is financed by debt, r would be the market rate on bonds i ; if it is financed by equity, r would be its cost of equity ρ . In general, then, the nominal financing cost can be expressed as $r = \beta i + (1 - \beta)\rho$, where β is the proportion of investment financed by debt. Hence, to be undertaken, the marginal dollar of investment must satisfy the following condition:

$$R = [\beta i + (1 - \beta)\rho] - \pi + \delta. \quad (1)$$

With taxes, the optimization principle still applies, but the equality of real returns and costs must now be stated on an after-tax basis. In this case, the real return to the firm of the marginal dollar of investment becomes $R(1 - u)$, where u is the corporate tax rate. The costs of that same investment must now also be modified as follows: (a) the real cost of financing, $r_t - \pi$, where r_t denotes the after-tax cost of financing; assuming that debt is deductible but equity is not, $r_t = \beta i(1 - u) + (1 - \beta)\rho$; and (b) while the real economic depreciation on the marginal dollar of investment δ remains un-

changed, the effective price (net of financing costs) of that investment is now reduced by the stream of future depreciation allowances provided for in the tax system. Denote the present value of such depreciation allowances by Z .¹⁰² Then, with taxes, the firm will invest to the point where the marginal dollar of investment satisfies

$$R(1 - u) = [\beta i(1 - u) + (1 - \beta)\rho] - \pi + \delta(1 - Z). \quad (2)$$

Notice that when $u = 0$ (no taxes), equation (2) reduces to equation (1).

As is well known, R can be viewed as comprising three parts: (a) an amount which is used to maintain the real capital stock of the firm; (b) an amount that goes to the tax authority; and (c) the remaining amount as the after-tax real return to savers on the marginal dollar of investment undertaken. Since by assumption capital depreciates at the rate δ , to maintain the real value of the firm's capital stock, the before-tax return to investment, net of depreciation, is not R but $R - \delta$. This is the r_g^e depicted in Figure IV.2. If the after-tax real return to savers is denoted by r_n^e as before, then the tax wedge, t , given by $r_g^e - r_n^e$, represents the tax revenue collected by the government on the marginal dollar of investment. The METR of this investment is, therefore,

$$\text{METR} = 1 - r_n^e / (R - \delta). \quad (3)$$

The after-tax real return to savers, r_n^e , is affected by, in addition to the corporate income tax, the savers' effective marginal personal income tax rates, which may or may not be different for different forms of corporate distributions, such as interests, dividends, and capital gains. A full treatment of these aspects of the income tax system is, however, beyond the scope of this Handbook.

With adequate macroeconomic data (such as the expected rate of inflation, the market interest rates, and the costs of equity), investment-specific data (such as the economic depreciation of different assets), firm-specific data (such as the financing mix between debt and equity), and tax variables (such as the depreciation system, and the structures and rates of the corporate and personal income tax systems), a tax wedge can thus be calculated for each type of asset (e.g., machinery) across different sectors of an economy. An example of such calculations is given below.

¹⁰² The value of Z is dependent on the adopted depreciation method. For example, under a declining-balance method with α as the tax depreciation rate, Z will be $\alpha u / (\alpha + r_t)$. Alternatively, under a straight-line method that permits an investment to be written off over T periods, Z will be $(u/r_t T) [1 - (1/(1 + r_t)^T)]$.

Table IV.10. Effective Corporate Tax Rates by Industry

Industry	Buildings	Machinery	Land	Inventories	Aggregate
Real cost of funds of 10 percent					
Agriculture, fishing, forestry	7.7	0.4	12.8	-14.6	2.1
Manufacturing	25.3	7.6	22.9	33.6	20.5
Construction	17.3	6.7	15.1	33.5	16.0
Utilities	32.5	31.6	25.8	42.3	32.2
Wholesale trade	22.9	18.9	24.3	31.2	27.1
Retail trade	16.9	25.2	20.6	26.9	24.3
Services	15.6	23.5	15.3	28.2	20.8
Total	24.0	20.5	18.3	32.1	24.0

Source: Boadway, Bruce, and Mintz (1987), p. 87.

Table IV.10 presents the METRs by industry for several investment types for Canada in the mid-1980s.¹⁰³ The first observation is that the METRs vary widely across capital assets and sectors. This implies that incentives for the allocation of resources across sectors would differ because of the different distortionary impact (intended or otherwise) of the corporate tax system. The METRs range from a tax subsidy of -14.6 for inventories in the agriculture-fishing-forestry sector to a tax burden of 42.3 for wholesale trade holding in inventories. The same matrix, however, also illustrates that, except for inventories investment in the agriculture-fishing-forestry sector (due to favorable inventory tax treatment only for this sector), inventories are the most highly taxed asset. Furthermore, other than the retail trade and service industries, investment in machinery is less highly taxed than investment in building (mainly owing to higher depreciation allowances for machinery). In general, land is also less highly taxed compared to buildings, but buildings are more highly taxed than machinery investment in some sectors.

In the aggregate, the matrix shows a more favorable tax treatment for investment in agriculture, fishing, and forestry (via a lower small business tax rate) as well as manufacturing and services industries (via an accelerated capital cost allowance write-off) than investment in other sectors. What is less obvious from the table, however, is whether the tax system is more distortionary for investment across sectors or more distortionary for the investment of different assets within each sector.

¹⁰³This empirical study is extracted from Boadway, Bruce, and Mintz (1987). The study assumed that the nominal interest rate is 12 percent and the expected inflation rate is 5 percent. Although this study is specific to Canada, the findings contained therein are broadly similar to studies conducted elsewhere; see, for example, Dunn and Pellechio (1990) and OECD (1991b), pp. 87-121. As mentioned above, a tax wedge can be created by the corporate tax system and/or the personal income tax system. Calculations presented in Table IV.10 only pertain to the distortion induced by the corporate tax.

Tax Incentives

DALE CHUA

- *What are the arguments for and against tax incentives?*
- *What are some of the more commonly encountered tax incentives?*
- *A country study: Do tax incentives do the task they are designed for?*

Proponents of tax incentives, especially those in the business community, often argue that tax incentives stimulate investment. They assert that by offering the correct incentives, there will be increased investment in the economy, generated from within and augmented by foreign investment flows. On the other hand, they argue that with free capital mobility, if a country does not match the tax incentives offered by neighboring countries, there will be capital flight from the country as capital searches for areas offering the highest after-tax return. Although there is some validity in these arguments, they tend to comprise only a small part of the total picture on which investment decisions are made.

There are more compelling reasons besides considerations that investment flows into a particular activity in a selected area.¹⁰⁴ For example, factors such as economic and political stability supported by adequate infrastructure, an untapped but trainable labor force, and natural resources are equally, if not more, important reasons for investors. Apart from these factors, some investors would also contend that a well administered tax system—with a low tax rate—that is certain and simple would rank even higher than tax incentives. Further-

¹⁰⁴For detailed country experience on the effect of tax incentives on investments, see, for example, Tanzi and Shome (1992), pp. 31-61; and Mintz and Tsiopoulos (1992).

more, whether tax incentives are effective in attracting foreign investment depends on the home country treatment of repatriated profits. If there was no prior agreement between the host and home countries with respect to special tax treatments of foreign investment, the tax revenue forgone by the host government may simply be transferred to the home country government.

Additionally, the benefits from increased investment induced by tax incentives must be judged against its costs to society. From an efficiency viewpoint, by favoring one form of economic activity over another, tax incentives distort relative prices, and therefore misallocate resources. Tax incentives may be viewed as inequitable because they single out a particular sector for preferential treatment. Further, they undermine the sense of fairness, because a heavier tax burden must be placed on other sectors to raise a given tax revenue. Moreover, the allocation of resources is distorted further since nonpreferred sectors must pay even higher taxes so that some activities may enjoy a lower tax liability. Finally, tax incentives undermine the simplicity of tax administration by increasing monitoring costs. From an empirical standpoint, experiences tend to confirm that tax incentives are likely to lead to tax evasion as a result of the accompanying complexity of the tax system, the high degree of selectivity, discretion, and control in granting of incentives. Experience also reveals that tax incentives are often not well targeted or confined to their original objectives.¹⁰⁵

In spite of these arguments, tax incentives are still observed in developed and developing countries as a policy option to induce investment. Countries offering such incentives believe that tax incentives, in whatever guise, must be the best and least costly way to encourage investments. We assess, in turn, three common incentives, namely, tax holidays, rate reductions, and investment tax allowances.

Tax Holidays

Tax holidays as an incentive are employed mainly in developing countries. An enterprise receiving a tax holiday is partially or fully exempt from the payment of the corporate tax over the period for which the tax holiday applies, usually in the early years of its operation. In certain cases, the renewal of a tax holiday upon expiration may be permitted or a period of lower than the normal corporate tax rate may be accorded to firms, but most countries offering such incentives re-

quire that once the holiday ends, the enterprise is treated no differently from a nonexempt business.

What are the issues associated with tax holidays? First, the usefulness of a tax holiday as an incentive depends largely on the profit status of a recipient firm. For a profit-making firm, a tax holiday raises its return on investments since profits are tax-exempt. The benefit is immediate. For an unprofitable firm, it offers little benefit since no taxes are payable anyway. This fact undermines the effectiveness of tax holidays as a policy option to encourage new investment because if the aim of the policy is to assist firms in the start-up stage, then it has clearly not achieved its objective since many firms in the starting periods are likely to be nonprofitable. On the other hand, there is no reason why firms that are profitable from the outset should be given added incentive to undertake an activity that they would undertake in any case.

From the viewpoint of a firm, however, whether or not a tax holiday is desirable will depend on the tax treatment of depreciation allowances accrued during the tax holiday period. If accrued initial and/or annual depreciation allowances cannot be carried forward, then the attractiveness of a tax holiday may be reduced because the "losses" arising from the inability to deduct depreciation charges (tax saving forgone) may outweigh the gains from a lower tax rate during the holiday period.¹⁰⁶

A second, but equally important, weakness is that a tax holiday erodes the tax base. The issue of base erosion is potentially more serious than simply the direct revenue forgone. As is often the case in developing countries, a tax-exempt enterprise may be part of a larger holding of nontax exempt companies. It is easy to shift income from profitable but taxable companies in the group to the tax-exempt enterprise through the transfer pricing of intercompany transactions. Hence, awarding tax-exempt status to a single firm may erode the tax base more than on first approximation, since such abuses are generally difficult to police.

Third, a tax holiday removes the appeal of debt financing of capital investment. This is because the interest cost of borrowing is a fully deductible item. A tax holiday, with a preferential or zero tax rate, increases the relative cost of debt financing by removing the benefits of interest deductibility. Furthermore, in countries where dividends distributed by tax-exempt firms are also exempt from the personal income tax, the relative attractiveness of equity financing is further in-

¹⁰⁵This conclusion is also observed in Shome, King, McCarten, and Pellechio (1993).

¹⁰⁶For an empirical study which employs the marginal effective tax methodology to Malaysia and confirms this result, see Boadway, Chua, and Flatters (1992).

creased. Whether or not this is desirable is harder to judge since, on the one hand, it implies that the optimal financial structure of a firm will be influenced by tax holidays, while, on the other hand, some would argue that the upshot of this effect is a sounder financial structure for the firm and will reduce bankruptcy risks.

Fourth, tax holidays encourage short-term investment because it is the type of investment that will benefit most from tax holidays. Longer-term investment can only benefit fully from tax holidays if the tax holiday is renewable.¹⁰⁷

In short, because tax holidays erode the tax base, create an opportunity for tax planning, increase monitoring cost, and tend to benefit only investments that are already profitable and/or short-lived, their value as a policy option to encourage investment should not be exaggerated. Furthermore, recalling that foreign capital inflows are affected by a web of factors, it should be obvious that tax holidays on their own are neither a necessary nor a sufficient condition for the encouragement of new investment.

Rate Reduction

Reducing the regular or general corporate tax rate is one of the best approaches to achieving the competing goals of tax policy design. Lending support to this view, corporate tax rates all over the world have been declining in recent times. In a world where some revenues have to be raised, a low corporate tax rate is currently seen as the best incentive. The strongest argument in its favor is that a lower tax rate increases the after-tax return to investors. Compared to tax holidays where some firms are treated more favorably than others, a single rate for all corporations is fairer, not selective, and administratively simpler. Monitoring cost will be reduced as the incentive for intercompany transfer pricing is eliminated. A stable and low rate, with minimal tampering with the tax system, has the additional benefit of promoting a sense of stability and increasing business confidence in the country's tax system. Against these advantages is the fact that a lower rate requires a larger base to raise a given amount of revenue. This implies that in a static setting, a nonexpanding tax base may be incapable of raising sufficient revenue if the tax rate is lowered.¹⁰⁸

¹⁰⁷This assumes that a short-term investment is profitable upon or shortly after setting up, while a long-term investment requires a longer gestation period before it makes a profit.

¹⁰⁸Another argument, valid only in a perfectly certain world, relates to older capital. In such a world, the return to owners of older capital would have accounted for all future tax liabilities of the enterprise; hence, an unexpected rate reduction would imply a larger-than-expected return to owners of old capital. This would imply an unexpected windfall gain to owners of existing capital.

Investment Tax Allowances

A common tax incentive found in many OECD and developing countries is the investment tax allowance. This incentive takes the form of a faster write-off for investment expenditures. It can appear under many guises which can be grouped as relating to (1) accelerated depreciation allowance, (2) investment expenditure allowance, or (3) investment tax credit.¹⁰⁹

Although the main effect of these investment tax allowances—an increase in the after-tax return for the firm—is broadly the same, the time profile of tax savings for the recipient firm is slightly different under each type. As a rule, an *accelerated depreciation allowance* that permits a quicker write-off for a qualifying investment will affect the cost accounting of a firm in a very specific way. Therefore, how much in taxes is saved up front, as well as the implication for future tax savings, will depend on the specific design of the accelerated depreciation allowance.¹¹⁰ In a different way, but having the same qualitative result of increasing a firm's after-tax return, an *investment expenditure allowance* allows a firm to write off a specific percentage of investment expenditure from its taxable income in the year the investment is undertaken. In this case, the relief constitutes a direct up-front tax saving for the firm. Lastly, an *investment tax credit* that permits a firm to reduce its tax liability by a fraction of the qualifying investment is also an up-front tax incentive. The difference between the last two is that the former is a deduction against taxable income while the latter is a credit against tax liability.

The main advantage of an investment tax or credit allowance is that its focus is specific. For example, a firm receives the benefit of the allowances against its tax liability only if it invests. Effectively, the investment tax allowance translates into a lower tax rate for the firm. Because it is narrowly based, proponents of this incentive argue that it can be used to encourage firms to take a long-term view by targeting long-lived capital goods with investment tax allowance. Furthermore, given that its focus is on current investment, there is a smaller erosion of the tax base relative to an across-the-board reduction in the corporate tax rate. As a rule, the actual value of any investment tax allowance depends largely on whether the firm is in a position to use the incentive. As in the case of tax holiday, if a firm

¹⁰⁹In a recent empirical study, the impact of certain investment tax allowances was summarized using the effective tax rate methodology for five Eastern European countries (Czechoslovakia, Poland, Hungary, Romania, and Bulgaria); see Mintz and Tsiopoulos (1992), pp. 10–11.

¹¹⁰For example, an initial allowance permits a firm to deduct up front a larger portion of its capital cost. See section above on depreciation schedules.

is in a tax-loss position, it may not be able to fully benefit from the investment tax allowance. For such a firm, the value of the incentive will be small if the authorities do not refund the allowance (that is, give the firm a refund equal to the tax value of the investment allowance benefit) or permit the carryback of unused allowance against previous year taxes.

The drawbacks, however, of investment tax allowances, apart from the obvious loss of tax revenue, are (1) that they tend to favor more established firms over new firms because the latter are more likely to be in a tax-loss position and will not be able to take full advantage of this incentive; (2) that because this feature is frequently associated with non-inventory investment, the selectivity of this incentive provides no benefit to those industries where inventory investment is important; and (3) that they favor capital goods that depreciate quickly because frequent investment implies frequent claim on the investment allowance for the firm.

Country Study: Canada

To reinforce the generally accepted view that tax incentives by themselves do not always solve the problems they are designed for, we review, in this section, a recent study in Canada that assessed the benefits and costs of using a specific tax incentive to promote private sector investment. The incentive adopted was an investment tax credit (the Cape Breton Investment Tax Credit), which was set at 60 percent of investment expenditure. The investment tax credit was introduced for a subregion of the Province of Nova Scotia during the period 1985–92, a region severely affected by an increase in unemployment because of major manufacturing enterprise shutdowns. An evaluation of the economic effects undertaken by the Government of Canada reported, among other conclusions, the following:¹¹¹

¹¹¹See Canada, Department of Finance (1989).

(1) By lowering the cost of capital, the tax credit led to a substitution of capital for labor (other things being equal, this substitution effect reduces employment).

(2) By reducing production costs in Cape Breton, the tax credit enabled firms to supply goods and services at a lower price and/or earn higher profits, which in turn stimulated production in the region.

(3) A direct subsidy to employment equal to the tax expenditure cost of the credit would have created more employment.

(4) Of the private investment that qualified for the tax credit, no more than 19 percent was estimated to be incremental.

(5) Based on interviews and on econometric evidence, it was estimated that for every dollar of federal tax forgone, 75 cents of new investment was stimulated by the credit.

(6) The tax credit improved labor productivity in the region, but decreased capital productivity, so that the credit is unlikely to contribute to the long-term improvement in the total factor productivity performance of the region.

(7) The cost of jobs created with this measure was extremely high.

(8) Economic policies that contributed to the attainment of high employment levels at the national level appear to provide a more promising method of mitigating regional income disparities than a regional investment tax credit.

The findings of the study are very specific and show that even in the case of a seemingly well-targeted tax incentive such as an investment tax credit, the cost to society is high, and that, to achieve a similar outcome, less costly alternatives might be available. Therefore, from a policy standpoint, the usefulness of tax incentives should not be overrated.

Cash-Flow Tax

PARTHASARATHI SHOME AND CHRISTIAN SCHUTTE

Introduction¹¹²

Conceptually, cash-flow taxation is based on consumption; thus, it is neutral with respect to capital formation. The practical advantages of cash-flow taxation—its definitional clarity and simplicity of measurement—were discussed in a U.S. Treasury report (1977). Perhaps they have received new interest as, more recently, tax theorists have also come to emphasize implementation and administration aspects of tax policy,¹¹³ especially for developing countries.¹¹⁴ The classic Haig-Simons ideal of a comprehensive income tax, based on consumption plus net accrual of wealth, seems to be rather problematic when judged by this criterion. It is argued that the hypothetical nature of the accrual concept tends to create complexities in the tax code, to increase the burden of administration and compliance, and to foster avoidance and distortion. Under these circumstances, a cash-flow tax base seems to be a promising alternative especially at the corporate level, where equity concerns about exemption of capital income are irrelevant and some technical problems are less salient.¹¹⁵

Opponents of the cash-flow tax question the superiority of the cash-flow tax base on equity grounds. Also, they are usually not optimistic about the administrative advantages of the tax. In the context of the corporate sector, they decry it primarily on the basis of implementation problems as well as the lack of international experience and, consequently, coordination. The doubts emanate from perceived difficulties in containing tax evasion because of transfer pricing practices or tax avoidance through intracompany leasing arrangements and because the tax may not be creditable in those countries that export capital until they themselves introduce the tax. Therefore, the tax may not be compatible with the existing international tax regime. In addition, political forces that lead to base erosion of the corporate income tax (CIT) are, of course, also likely to affect the corporate cash-flow tax (CCFT). While the cash-flow base may address some inherent shortcomings of the income tax, in and of itself, it is unrelated to the po-

litical willingness and ability to keep a tax system clean of special provisions and targeted incentives.

Conceptual elements

Conceptually, the CCFT has been discussed as a supplement to a personal expenditure tax, a personal income tax, a value-added tax (VAT), and as a tax on economic rent. The CCFT base also varies in conception, reflecting whether real transactions or real and financial transactions are taxed.

- *CCFT tax base.* There are three types of CCFTs:

(1) The R-based CCFT (real) is one in which the tax base is net real transactions—that is, the difference between sales and purchases of real goods and services. As opposed to an income tax, the distinctive features of such a tax base are immediate expensing of capital outlays and the nondeductibility of interest payments. At the same time, interest received is no longer taxable.

(2) The RF-based CCFT (real plus financial) is one that also includes nonequity financial transactions—that is, the difference between borrowing and lending. Interest and retirement of debt would be deductible, but borrowing and interest received would be taxable: $\text{RF base} = (\text{sales} + \text{borrowing} + \text{interest received}) - (\text{purchases} + \text{interest paid} + \text{debt repaid})$.

(3) The S-based CCFT taxes the net flow from the corporation to shareholders—that is, $S = (\text{dividends paid} + \text{purchases of shares} - \text{issues of new shares})$.¹¹⁶ The S base is conceptually equivalent to the RF base minus the CCFT, as can be seen from a basic accounting identity: any difference between total business inflows and outflows has to be paid out either to shareholders or as tax, $\text{RF} = S + \text{CCFT}$. Since taxes enter into the sources and uses-of-funds statement, the rate of the RF-based tax would be tax inclusive. The S-based rate would be tax exclusive—it could well be higher than 100 percent.

- *Selected characteristics.* The CCFT represents a silent partnership for the government in an investment. This is most clearly seen for the S base where the government, in fact, sustains tax losses from equity raised and receives revenue from distributed earnings. As out-

¹¹²This is an abridged version of Shome and Schutte (1993).

¹¹³See Kay (1990).

¹¹⁴See Khalizadeh-Shirazi and Shah (1991).

¹¹⁵Many middle-income countries, especially in Latin America, are considering a cash-flow tax.

¹¹⁶Since share transactions between corporations cancel out, the aggregate S base represents the net flow from the corporate sector to shareholders.

flows and inflows for the corporation are reduced proportionately by the "silent partnership," the rate of return on an investment remains unaffected by taxation.

The "silent partnership" enables the government to appropriate a share of the above-normal returns that are generated in the economy (and a share in the cost of below-normal returns). Those above-normal returns may be economic rents from entrepreneurial activity, from nonrenewable resources, or from monopoly, but can also be investors' compensation for risks which on average will be positive. Hence, the CCFT can also be interpreted as a tax on pure profits and on returns to risk taking.

From a theoretical perspective, there are a number of other attractive features of a CCFT:¹⁷

- The exemption of marginal returns implicit in immediate expensing does not discriminate between debt and equity. The income tax favors debt over equity by allowing deduction of interest only. Partial integration of corporate and personal income taxation does not solve this problem as long as there is a substantial spread of marginal investor-tax rates.
- Immediate expensing also ensures neutrality with respect to the rank-ordering of projects.
- Except for situations of hyperinflation (where even annual expensing falls short of a full deduction of real investment), the cost of capital is not affected by inflation under the CCFT.
- If the CCFT is introduced alongside a personal income tax, there is no need to integrate the two taxes. Because capital income is effectively exempt at the corporate level under the CCFT, the appropriate treatment would be the classical system under which the corporation is treated as a separate entity and no effort is made to attribute its earnings to equity holders.
- In addition, the CCFT is based on current transactions and hence avoids the timing-related problems of a typical income tax: expensing replaces calculation of "true economic depreciation" as well as the need for inflation adjustment of inventory and asset replacement values. The problem of capital gains is irrelevant.

For practical purposes, however, two critical assumptions underlying the theoretical neutrality results need to be stressed: it is assumed that tax rates are constant and that taxable inflows are always sufficient to offset expenses, so that an investment will actually produce an initial tax reduction.

Practical Considerations

While the CCFT cannot be strongly criticized for lacking theoretical foundations, it does come up against some practical hurdles. The important practical considerations for the CCFT fall into two categories: those that involve the transition phase and those that involve its general implementation.

Transition issues

There are numerous concerns that arise during the transition from a CIT into a CCFT. First, a "cold turkey" transition would produce windfall-tax revenue by denying companies their existing depreciation allowances. On the other hand, allowing immediate expensing of remaining depreciation could adversely affect revenue. A hybrid of allowing continued depreciation might be the only practical solution. As Sunley (1989) points out, however, such "transitional" arrangements may have to last for a number of years.

It is suggested that a short-term revenue loss is likely during the transition. Various arrangements could accommodate the amortization of old investment while new investment could generate substantial tax losses. In order to mitigate this effect, one may resort to "present value expensing"—that is, during the transitional period, deductions for new investments could be spread out over several years, grossed so that their present value would still equal the initial outlay. This would raise the issue of using the right discount rate.

The particular choice of the CCFT base and transitional provisions will obviously affect the financial position of firms. Under an R-based CCFT, leveraged firms could face financial distress because interest would no longer be deductible. Yet, continued interest deductibility for old debt might be prone to manipulation—particularly since old debt would be difficult to define. The solution, therefore, would seem to be an RF-based CCFT.

In the very short term, the tax may have undesirable announcement effects. Investment might collapse in anticipation of future expensing unless the tax can be introduced retroactively. If the prospective CCFT is RF-based, firms may increase borrowing and later repay debt by raising equity. Whether retroactive enactment is possible could depend on political factors.

General issues

Under a CCFT, issues such as the stability of revenue, a high possible incidence of tax avoidance and evasion, and international compatibility assume particular importance. These are addressed below.

¹⁷See King (1986).

• *Revenue implications.* The CIT is an important source of revenue in many developing countries. Following a bell-shaped curve, its share of GDP and total revenue generally increase in the initial stages of development, so that for different income groups of developing countries, the CIT makes up between 11 and 23 percent of total revenue. In a few cases, the CIT accounts for more than one-fourth, even more than one-half, of total revenue.¹¹⁸ In industrial countries, the CIT has become relatively unimportant over time.

The revenue implications of any change in corporate taxation have to be weighed very carefully in this context—even if one may argue that, in the long run, the CCFT is likely to foster growth through increased investment and improved capital allocation and that the government would participate in such growth. If we leave aside both the purely transitional issues and the longer-term structural and dynamic effects, what can be said about the revenue implications of the CCFT?

(1) *Smaller tax base?* There are conflicting views about the likely differences in the size of the corporate tax base under the CIT and the CCFT. The straightforward argument against the CCFT is that full and immediate expensing seems to reduce the tax base. The government forgoes tax on the marginal returns to capital, and one would therefore expect the CCFT rate to be higher than the initial income tax rate if present-value revenue is to be sustained.

On the other hand, proponents of the CCFT have based their case partly on the massive erosion of the tax base under the CIT.¹¹⁹ They argue that most marginal returns escape taxation anyway. Firms find it advantageous to finance their investments through debt, as nominal interest payments are deductible. Foreign investors may choose “thin capitalization” to shield their income from host country taxation and to facilitate repatriation. Legislative rules against excessive interest deductions often are not fully effective. Firms may also avoid taxation of capital income by making use of special incentives, such as accelerated depreciation, tax arbitraging, tax-preferred activities, and investing abroad.

Empirical work on developed countries suggests that the CCFT and the current income tax base would not be very different in many cases.

In developing countries where the corporate sector is dominated by large mineral exporters, local cartels, monopolies, and debt-financed foreign corporations, the existing CIT may also be fairly close to a pure prof-

its tax, as the tax base mainly consists of above-normal returns.

(2) *Investment and current revenue.* The tax yield under the CCFT would also tend to be very sensitive to investment. Under an income tax with “true economic depreciation,” gross returns and offsetting capital allowances on an investment follow the same time pattern. But, under the CCFT, taxable inflows from past investments are partly offset by the expensing of new outlays. Hence, current revenue will depend on the difference between the average rate of return and the rate of growth of the capital stock. During periods of rapid expansion—which, for instance, may follow structural adjustments in reforming socialist economies—revenue could dry up or even become negative, at least theoretically. In other words, revenue could drop during upswings in economic activity, making the tax procyclical.

(3) *Revenue risk.* As the government assumes the “silent partner” role with full loss-offset, revenue from individual projects becomes more risky—though its expected value is still positive if investors are risk-averse. Still, the “silent partnership” should not cause substantial variations in total revenue as long as independent risks of many projects can be pooled. But in the case of a small country with only a few major projects, or in the case where risks are correlated, variability of revenue as such may be an additional concern.

(4) *Other effects.* Two other revenue-related points deserve mention. First, introduction of the CCFT may require substantial improvements of loss-offset provisions of the existing CIT. Such improvements may be costly in terms of revenue if previous loss trading between corporations was imperfect. Second, there may also be a revenue-increasing effect if a CCFT actually improves the administration of taxes on small businesses and other hard-to-tax groups.

To conclude, the revenue effect of replacing a CIT with a CCFT remains an empirical question. Whether or not a revenue-neutral CCFT would require higher rates depends on the particular income tax laws that are to be replaced, the value of economic rents earned in the corporate sector, and the current debt-equity compositions of corporate portfolios. Transition rules might be needed to soften any adverse revenue effect of the conversion, and such rules may have to be applied for a considerable period of time.

Tax avoidance and evasion

The above discussion of revenue effects excluded possible behavioral responses on the part of corpora-

¹¹⁸See Tanzi (1987).

¹¹⁹See Kay (1990) and King (1986).

tions. As firms, however, will try to exploit possible new "loopholes" in the CCFT, revenue could be lost and tax administration might face new challenges.

(1) *Gaming the system.* Some tax avoidance possibilities are specific to the R-based CCFT, as there is an entire class of schemes exploiting the crucial difference between taxable real flows and tax-free financial transactions.¹²⁰

- Installment sales to a tax-exempt party may understate the taxable purchase price but overstate the tax-free interest component of seller financing.

- Labor, goods, and services may be sold at low prices and assets leased at low rates to a tax-exempt party, who in return would provide a low-interest loan to the employee, seller, or lessor; prearranged defaults and loan forgiveness would be extreme cases of such low-interest loans, unless they are included as imputed flows in the tax base.

- Companies with different accounting years may reduce their tax bases by increasing purchases from each other. At the end of its accounting year, company A could make large purchases from company B and vice versa. These intercompany transactions could be debt-financed without tax consequences.

- To circumvent nondeductibility of interest payments, financing may be provided by a tax-exempt seller or lessor. Interest payments would be transformed into deductible leasing payments or purchases.

To contain these arrangements, McLure suggests that for tax deduction purposes, ceilings and floors may need to be imposed on interest rates.¹²¹

Under both the R and RF bases, taxpayers may try to shift the tax base to an affiliated low-tax party, for instance, a tax-exempt pension fund or a foreign corporation with a lower rate. Expensable capital outlays would be allocated to the high-tax party, and subsequent cash inflows would be directed toward the low-tax party. Such base shifting may take the following forms:

- transfer pricing through the purchase of inputs from the low-tax party at inflated prices, and the sale of goods at understated prices;

- low-rate leasing of capital acquired and expensed by a high-tax party to a low-tax party; and

- selling expensed assets at understated prices to the low-tax party.¹²²

Such schemes could be operated under the income tax as well, but the incentive for them is much more powerful under the CCFT. This is because expensing makes the present value of deductions on any asset equal to the purchase price. Under any other depreciation scheme, the present value of deductions decreases with the longevity of an asset and with the discount rate used by the corporation.¹²³ Also, because the entire deduction is available up front under the CCFT, immediate sale of the asset at an understated price becomes much more attractive. Under an income tax, the high-tax party would have to hold on to the asset to benefit from available depreciation.

A CCFT will hence increase the incentive for tax-saving leases and for mergers between corporations with different tax rates. Foreign corporations may set up subsidiaries in the CCFT country only to take advantage of expensing, then channel inflows to a lower-rate jurisdiction.

Manipulation of reported transactions may also be an important channel of tax evasion. Companies could try to overstate asset prices upon purchase to tax authorities. They could also buy equipment, take the deduction, and immediately resell, concealing or understating the price. These possibilities also arise under the income tax. Again, however, expensing, which grants tax savings up front, increases their attractiveness.

To counter base-shifting schemes, arm's-length prices and rates for transactions between affiliates have to be enforced. But such monitoring is notoriously difficult. Perhaps certain types of transactions, such as leasing to foreigners or tax-exempt institutions, would need to be prohibited. If there is a system of wealth taxation, it may put some checks on the valuation of transferred assets. All such requirements, however, would result in considerable complications, essentially eroding the tax's main characteristic—simplicity—on which its proponents base its attractiveness.

Some general lessons from the income tax apply even more so to the CCFT in this context. Tax treatment of activities and institutions should be uniform to re-

¹²⁰See Sunley (1989).

¹²¹See McLure (1991).

¹²²The problem arising from the possibility that firms may move once they have expensed an investment (Tait (1992)) could be alleviated by taxing them upon migration. Since they previously benefited from expensing, such a tax should not be in conflict with free international capital movement.

¹²³There is very little to be gained from shifting long-lived assets under the income tax. Think of land as the most extreme case. It is not depreciable under the income tax—but should be expensable under the CCFT.

duce arbitraging opportunities. For instance, some business activities of tax-exempt institutions may be taxed. The rate structure should be flat and low to the extent possible (given revenue needs), since it determines the taxpayer's per-dollar savings from reducing or shifting the tax base.

(2) *Tax exhaustion and tax avoidance.* A special case of uneven rates arises from tax exhaustion, where available deductions exceed taxable inflow. A tax-exhausted corporation has a marginal tax rate of zero, though its statutory rate may be quite high. It is unable to benefit from capital allowances.

Excess allowances (through tax losses) are likely to be much larger and more frequent under the CCFT. Especially with an R base, however, whether or not the resulting lumpy tax profile will foster additional arbitraging and mergers largely depends on loss-offset provisions. To the extent that such provisions ensure symmetrical treatment of profitable and loss-making corporations, profitable arbitraging would be curtailed.

Loss offsets are crucial to the CCFT in conceptual terms as well, and a refund would be the straightforward solution. Refunds may be problematic though, in that they aggravate the problem of "hobby farms": businesses solely set up to generate tax losses on consumptive, nonprofit-oriented activities. Rules against such abuses under the income tax would have to be carried over to the CCFT.

To conclude this section on tax avoidance and evasion, a summary assessment of the R and RF bases is called for. The administrative advantage of the R base is that financial transactions can be entirely ignored. This actually reflects the basic concept of CCFT—equal treatment of debt and equity. On the other hand, the R base is vulnerable to the above-mentioned tax avoidance schemes. With the RF base, the tax profile is less lumpy, and incentives for base shifting and evasion are reduced. The RF base, however, has an incentive to raise capital as equity and disguise payouts as interest payments, a problem that is shared under the income tax. Therefore, the existing CIT provisions to ameliorate these problems would have to be carried over to the RF-based CCFT.

International issues

Since the CCFT is an untried tax, many legal and economic questions remain with respect to its international compatibility, especially where tax treatment of foreign investment income is concerned.

(1) *Basic concerns.* The introduction of a CCFT raises serious questions about international compatibility. These questions concern legal as well as economic

aspects. As the CCFT might not legally qualify as an income tax, its adoption could require the renegotiation of tax treaties. Such negotiations tend to take many years and hence imply considerable transactions costs and transitory arrangements. Moreover, tax treaties for many host countries offer a stability that they may not want to risk. Reforming socialist countries that ultimately want to join the European Community (EC) may find the CCFT unacceptable simply because it would not conform to the EC requirement for a CIT.¹²⁴

Host countries are worried about losing existing options for "soaking up" foreign tax credits. Also, there has been an overriding concern that home countries—in particular, the United States—might not grant foreign tax credit for the CCFT and that this might discourage foreign investment. The creditability problem was the major obstacle for the adoption of CCFT proposals in Canada, Mexico, Sweden, and Colombia.¹²⁵

(2) *Principles for taxation of foreign earned income.* Briefly recalling the basic principles that are applied to the taxation of foreign income,¹²⁶ the following three regimes can be distinguished:

- *Exemption.* Home countries impose no tax at all on income earned abroad. This is sometimes also referred to as the territorial system. Income is only taxed by the host country (source principle).
- *Taxation upon accrual.* Home countries reserve the right to tax worldwide income of their resident corporations (residence principle), and foreign income is taxed as it is earned. Taxation upon accrual is typically applied to foreign branches of resident corporations.
- *Taxation upon repatriation.* Home countries apply the residence principle. Corporations can, however, defer their domestic tax liability by retaining earnings abroad. Because of the time value of money, deferral reduces the effective domestic tax rate. This regime is typically applied to subsidiaries.

If home countries apply the residence principle, foreign income is potentially subject to double taxation in both host and home countries. Double taxation can be mitigated in different ways. First, the home country may allow deduction of taxes paid abroad. This is actually the efficient policy, since foreign taxes represent a

¹²⁴As a consequence of growing economic integration, the coordination of capital income taxation will become even more important in the EC. Though there are advocates of "spontaneous coordination" through increased competition of tax systems, this approach has serious problems. EC countries will rather want to increase managed harmonization of existing CIT systems (Tanzi and Bovenberg (1990)). A CCFT would hardly fit into this process.

¹²⁵See Boskin and McLure (1990).

¹²⁶See OECD (1991b).

social cost to the home economy. If deduction is granted, resident corporations will equalize the after-tax foreign return to the pretax domestic return. This is not optimal from a global point of view, however, since capital export is discriminated against. Second, to ensure capital-export neutrality, many home countries grant a tax credit against foreign taxes paid. Corporations will then equalize pretax rates of return. In terms of revenue, the tax credit implies that, in fact, home countries bear the foreign tax burden of their resident corporations. Unless additional tax treaties impose restrictions, the host country can "soak up" those tax credits—that is, it can tax foreign investors without deterring them. The tax credit, however, is usually limited to domestic tax liability (on the sum of domestic and foreign incomes), so that corporations ultimately face the higher of the (average) foreign or domestic tax rate. If the domestic rate is higher, the corporation will face the same effective tax rate at home and abroad. If the foreign rate is higher, the corporation may accumulate excess tax credits. Under a system of tax credit by source, such offsets are limited to income from a particular host country. Under the more generous worldwide tax credit system, excess tax credits may be used against tax on income from any host country. In this case, the corporation actually faces the higher of the domestic and the average foreign tax rate.¹²⁷

(3) *CCFT and foreign direct investment.* Here, three regimes can be identified.

- *Exemption at home.* The concerns about revenue and creditability are irrelevant for foreign investment from home countries which grant exemption for foreign dividend income; in this case, the host country will attract additional foreign investment until the pretax rate of return is equal to the after-tax rate of return in the home country.

- *A creditable CCFT.* What if the home country taxes foreign earnings? Let us first assume that CCFT would be creditable. Another crucial distinction has to be made between corporations whose available tax credits are less than their domestic liability on foreign earnings (their so-called excess limit position) and those who have excess credits.

¹²⁷Countries often do not apply one principle consistently but have special provisions for different circumstances. In general, tax exemption for foreign-source dividend income from all countries, or at least from tax-treaty countries, is provided by the following OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Sweden, and Switzerland.

The tax credit system for foreign dividends is used by Greece, Iceland, Ireland, Italy, Japan, New Zealand, Norway, Portugal, Spain, Turkey, the United Kingdom, and the United States. Iceland, Japan, and the United States provide worldwide tax credit; all other countries use the more restrictive credit by source. (See OECD (1991a), p. 63.)

If corporations are in an excess limit position, the tax credit mechanism would wash out the effects of host country tax policy. The revenue argument against CCFT is based on this point. While the investment incentive of the CCFT would be neutralized, revenue is forgone, simply to be picked up by the home country.

Note, however, that this argument would not hold in the presence of "tax sparing," if tax sparing were to apply to the CCFT as well as to specified investment incentives under the income tax. Under tax sparing, the home country assumes that full tax has been paid in a foreign (host) country, in effect calculating foreign tax credit on the basis of regular foreign tax rates regardless of actual taxes paid (on the basis of preferential treatment). This approach protects host country tax incentives. With the notable exception of the United States, many capital-exporting countries (such as Japan and the United Kingdom) have signed tax-sparing treaties with developing countries.

Note also that under a "deferral system," retained earnings are tax exempt in the home country. The investment incentive of the CCFT may therefore remain effective.

- *A noncreditable CCFT.* So far, it was assumed that the home country would grant foreign tax credit for the CCFT. Possible noncredibility of the CCFT in home countries, however, especially in the United States, has been a major concern in countries considering the tax. There is no clear answer in advance to the legal question of creditability, although there seem to be policy reasons favoring its creditability. What if the CCFT were not creditable? Would double taxation discourage foreign investment? McLure (1991) points at three qualifications to this common argument. First, "mature investment" may still be attracted by the CCFT because a repatriation tax does not affect rates of return at the margin. Second, corporation may have excess tax credits and therefore be back to source-based taxation at the margin. Third, it may be argued that a tax with a marginal effective rate of zero "even when combined with a (home country) tax on repatriated earnings is unlikely to have much disincentive effect on investment in the host country."¹²⁸ A noncreditable CCFT will not distort investment at the margin, because for projects just earning the opportunity cost of capital, net CCFT payments will simply be zero.

For a project earning above-normal returns, the CCFT burden that is deductible but not creditable at home will become an additional cost. To the extent that such investment is mobile, it will be discouraged

¹²⁸See McLure (1991), p. 21.

by the CCFT. One may argue, though, that above-normal returns on investments in developing countries are often earned on immobile production opportunities (for example, extraction of mineral resources or exploitation of a local monopoly by a multinational trademark). In these cases, the noncredibility of a tax on pure profits will have no effect. Note, however, that the noncredibility of CCFT is likely to entail the noncredibility of any supplementary withholding taxes. A noncreditable withholding tax would clearly introduce a distortion even for marginal investment.

Conclusions

The CCFT has the drawback of any untried tax innovation, simply that "no one does it."¹²⁹ There is no experience and administrative know-how about the possibly complex details of a transition to the CCFT, its operation, and the avoidance schemes that might emerge. No official ruling on the critical question of the creditability of the CCFT has been required so far. The uncertainty costs of experimenting with the tax may be reason enough for a developing country or an economy in transition not to implement the CCFT. The purpose of this chapter, however, is to identify potential sources of problems and to better understand the conditions for a successful experiment with a CCFT. It seems clear that, depending on the existing CIT structure, the structure of the corporate sector, the relative importance of foreign investors, and the mix of countries they come from, some countries may find the CCFT more attractive than others.

The key conclusions of the chapter may be briefly summarized with the following:

1. The theoretical pros of the CCFT seem clear. It can be interpreted as a "silent partnership" of the government in any investment, and as such, it is generally neutral with respect to financial and real decisions of corporations. The neutrality result has to be taken with a grain of salt as loss-offset provisions are likely to be imperfect and some erosion of the tax base through lobbying and similar means is probably unavoidable. Expectations of future rate changes may also modify the results. Still, in a closed economy, the CCFT would tend to increase investment and improve the allocation of capital. On the administrative level, a tax based on observable cash flows rather than on a hypothetical concept of accrual of income promises to be simpler and more robust (again, theoretically speaking). It would do away with the problems of defining "true

economic depreciation," measuring capital gains, costing inventories, and accounting for inflation.

2. Possible revenue impacts are an important aspect of the CCFT, especially in developing countries, since the CIT to be replaced is often a major source of revenue. Revenue losses are likely during the transition period, but they need not be prohibitive if the transition is carefully designed and tax rates are appropriately adjusted. A more fundamental issue, however, is that the CCFT as a tax on above-normal returns may have a significantly smaller base than the comprehensive CIT. With expensing, the tax base may also be more volatile. Nevertheless, the actual difference between the CCFT and CIT bases remains an empirical question, depending on the particular income tax laws to be replaced as well as the current compositions of corporate portfolios between debt and equity. In some cases, the two bases may be fairly similar.

3. Tax-base erosion through tax avoidance and evasion may be a serious problem for the CCFT. By choosing an RF-based CCFT over an R-based one and by carefully designing the tax code, some of the CCFT schemes could probably be contained at reasonable administrative costs.¹³⁰ But the large up-front deduction that results from the expensing of capital assets would create a powerful incentive for base-shifting schemes. The administrative efforts required to contain these schemes could be considerable and would involve the enforcement of arm's-length prices, which is notoriously difficult. The "simplicity" argument for the CCFT has to be qualified accordingly.

4. Any answer to whether international considerations favor the CCFT would be complex. To the extent that host country tax policies matter, a country with the CCFT may attract additional investment. This is most clearly the case if home countries exempt foreign earnings of their multinationals—as do many Western European countries. Other important capital-exporting countries, such as Japan, the United States, and the United Kingdom, apply the residence principle with a foreign tax credit. This system tends to neutralize host country tax policy, but not entirely. The incentive offered by the CCFT is likely to remain effective for investors who benefit from tax sparing, which is granted by many countries but not by the United States. The CCFT is also likely to attract additional "mature" investment and investors who have excess tax credits. Recently,

¹²⁹To recall, this is not to say that the R-based CCFT has no advantages over the RF-based variant. After all, one attractive feature of the cash-flow tax is the nondeductibility of interest that eliminates incentives for debt-over-equity financing, and obviates any need for adjustments for inflation to calculate real interest. These are properties of an R-based, rather than of an RF-based, CCFT.

¹³⁰See McLure (1991) and Mintz and Seade (1991).

many U.S. corporations have accumulated such credits, although this position may not be stable in the long run.

To the extent that the effect of the CCFT is washed out by the tax credit mechanism, the host country will lose. Tax forgone on marginal returns is merely picked up by the home country. In the case that the home country denies tax credit for the CCFT, some foreign investment would be discouraged. The creditability of the CCFT is an issue related mainly to the United

States, since most other developed countries either exempt foreign earnings or grant some form of tax sparing.

To conclude, at this point, the CCFT remains a theoretically attractive option with some practical disadvantages. Moreover, many unanswered questions remain for its implementation by a single country—especially a developing one—in an environment that will not necessarily accommodate its smooth and effective operation.

Payroll Taxes and the Funding of Social Security Systems

JANET STOTSKY

- *What is the appropriate roll for payroll taxes in a tax system?*
- *What do we mean by funded versus pay-as-you-go social security systems?*
- *What are the major design issues in a payroll tax?*
- *Who bears the burden of a payroll tax?*

Payroll Taxes Defined

Payroll taxes refer to taxes paid by employers and employees on the wages of employees. Payroll taxes are generally applied as a flat percentage of an employee's gross wages up to some specified limit. These taxes have comprised a rapidly growing major tax source in recent years. In most OECD countries, payroll taxes are the principal means of supporting social insurance programs. Although there is no clear consensus on what social insurance programs government should provide, in most cases, these taxes fund social security, health insurance, unemployment insurance, and disability insurance programs. They may also fund general income support programs, but this is rare. Unlike other major taxes, payroll taxes are generally earmarked and their payment confers a right to benefits. Thus, it is sometimes argued that they are not so much taxes as prepayments for expected benefits to be received in the future.

Earmarking

Payroll taxes are unusual in that their revenues are generally earmarked for specific purposes. The argument against earmarking revenues is that it introduces rigidities into the budget process by requiring revenues to be spent on particular programs regardless of need. In some countries, payroll taxes are not only earmarked to social insurance in general, but to specific social insurance benefits, further limiting government flexibility. The argument in favor of earmarking is that taxpayers may be more willing to pay their taxes when they perceive that they are receiving something tangible in return. In addition, earmarking shields revenues from the vagaries of the legislative process, where funds for im-

portant programs could be cut in favor of less important programs for political reasons.

Pay-as-you-go Versus Funded System

Originally, many social security programs were set up with the explicit notion that they would be public pension programs and not income support programs, thereby warranting a close correspondence between tax payments and benefits. Although some social security programs were set up on a funded system, most have been converted to a pay-as-you-go system over time, although selected Asian countries have continued with "provident funds," which operate pension schemes on a funded system. Under a pay-as-you-go system, the taxes that current workers pay cover expenditures for current beneficiaries. In contrast, under a funded system, the taxes that current workers pay are accumulated in a reserve fund to cover their future benefits. A pay-as-you-go system does not rely on the accumulation of a reserve fund. Private pension plans are required to operate their plans on a funded system, generally with government monitoring to ensure that sufficient reserves are being accumulated in the fund. A pay-as-you-go system can provide an economically superior outcome than a funded system if the return on investments is lower than the growth of the taxable base (in this case, payroll). In recent years, the opposite has occurred, however. Thus, social insurance programs have faced the problem of rapid growth in current and future liabilities as a result of an aging population and expansion of benefits. At the same time, they have confronted a significant reduction in the growth of the tax base as a result of declining productivity and population growth. It is difficult to operate a pay-as-you-go system on an actuarially sound basis under such adverse circumstances. There has thus been some tendency to move toward a funded system for social security, making it more like a private pension plan.¹³¹

In the United States, the social security system was substantially overhauled in 1983. The major changes were a significant increase in tax rates matched by some reduction in future benefits, thereby leading to the accumulation of a surplus in the social security trust fund. The accumulation of this surplus is trans-

¹³¹See Shome and Squire (1983) and Halter and Hemming (1987).

forming, in part, the system from a pay-as-you-go to a funded one. The generation that is paying for the accumulation of the surplus is effectively paying not only for the retirement of the current generation but also for its own retirement (at least in part). This is the outcome of converting from a pay-as-you-go to a partly funded system. The movement toward a funded system strengthens the case for earmarking social insurance contributions so that this money can be kept separate from general government accounts, where it could be spent on expenditures other than those for which the contributions were made.¹³²

Design of Payroll Taxes

Compared to the personal income tax, payroll taxes are a model of simplicity. Nevertheless, there are still several issues regarding the choice of tax base and rates that arise in their design.

Tax base

With respect to the choice of base, most countries apply the tax to gross wages rather than to the often much narrower labor income base of the personal income tax. Some countries, however, have moved toward a similar base for payroll taxes and the income tax with a more unified system of funding social insurance programs and general government. The appeal of applying the tax to gross wages is that it enhances the vertical and horizontal equity of the tax. The disproportionate benefits that higher income taxpayers get from the use of tax preferences reduces their taxable income and hence, the vertical equity of the personal income tax structure. The uneven benefits that taxpayers get from the use of tax preferences reduces horizontal equity.

Most countries do not exempt any wages before applying the payroll tax, unlike in the case of the personal income tax. Some countries do allow a small exemption, but generally set the threshold lower than for the personal income tax. Usually, countries do, however, set an upper limit on wages subject to the tax. The argument for placing a ceiling on taxable wages is that since payroll taxes fund social insurance programs that are not designed to entirely replace private insurance and pension programs, higher-income individuals could supplement their social insurance programs with private insurance and pensions. Hence, there is no need to provide insurance beyond some reasonable level. The limit on benefits should thus correspond to a limit on taxes. Most countries still main-

tain ceilings on taxable wages, but have in many cases increased them (and in some cases, abolished them) in recent years, as revenue needs for social insurance programs, especially health, have grown, and governments have introduced and acknowledged a more explicit redistributive component to social insurance programs while extending their scope to the population.

Rates

There are several important issues with respect to the structure of payroll tax rates. A first issue is whether to have separate rates for each social insurance program or a single rate that covers all benefits. In most OECD countries, schedular rates applicable to specific programs are the norm. Although, in some countries, the schedular rates have been replaced by a general supplement to the income tax or a combination of both methods. The benefits of using a schedular approach depend on the degree to which earmarking of the taxes is viewed as desirable, since it makes earmarking easier.

A second issue is what form of tax rate to use. Originally, several countries structured the tax as a flat amount on wages, but virtually all have moved to an ad valorem tax over time. A related issue is whether to levy the tax with a single rate or a graduated rate. Most countries have levied a single rate, in keeping with the original intention that these taxes should fund contributory social insurance programs rather than redistributive income support programs. Only the United Kingdom levies a graduated rate.

Statutory incidence

One of the most important political issues with respect to the design of the payroll tax is how to split the liability for the tax payment, termed the statutory incidence, between the employer and employee. The most typical arrangement is for the employer and employee to share the statutory incidence equally, that is, for there to be a 50–50 split. But, any arrangement is possible, as is demonstrated by cross-country experience.

Burden of the Payroll Tax

While the statutory incidence may be important for political reasons, it is a well-known principle of tax theory that the statutory incidence is irrelevant in determining the economic incidence (see Chapter II). The burden of the tax ultimately depends on a complicated set of behavioral responses to the tax. In the short run, since wages are generally contractually

¹³²Pechman (1987) examines the U.S. social security tax in detail.

fixed, employers will try to pass on any increase in payroll taxes through higher prices for output. At these higher prices, however, the quantity demanded of the output is likely to fall. The short run effects depend in part on whether the government undertakes fiscal or monetary measures to offset the macroeconomic effects of the tax change. To prevent output from falling, the government could undertake stimulative fiscal or monetary measures. A complete analysis would also account for the incidence of the benefits of social security programs.

In the long run, the burden is likely to be largely shifted back to the labor market.¹³³ If employees have a certain productivity, which their wages reflect, this productivity is not altered by the payroll tax (the tax does not fundamentally change production relationships). Thus, the wage (inclusive of taxes) that employers will ultimately want to pay will reflect this unchanged productivity. Thus, the outcome ultimately largely depends on the elasticity of labor demand and the elasticity of labor supply with respect to the wage (see Chapter II). The economic incidence of a tax generally falls on the side of the market whose demand or supply is most inelastic. Thus, to the extent that labor supply is more inelastic than labor demand, the economic incidence of the tax, regardless of the source of statutory contribution, is likely to be shifted onto employees through a reduction in their net of tax wages. More concretely, this suggests that a 15 percent payroll tax, with statutory contribution shared equally between the employer and employee, ultimately results in a 15 percent decline in net of tax wages rather than a 7.5 percent decline in net of tax wages (and a 7.5 percent decline in the return to other factors). In contrast, if employers were unwilling to alter their demand for labor in response to changes in the tax, the economic incidence of the tax would fall on them, either by lowering the return to capital or other factors, or by lowering profits. If demand for the product were inelastic, the burden of the tax could also fall on consumers through increased prices of outputs.

Empirical evidence on the economic incidence of the payroll tax is inconclusive, given the many difficulties inherent in such an exercise. Nevertheless, the evidence supports the view that in the long run, the economic incidence of the payroll tax largely falls on employees. In the short run, however, employers may not be able to shift the burden of the tax entirely onto employees; thus, they or consumers may also bear some of the burden of the tax.

Assuming that the economic incidence of the tax is on employees, the structure of the tax leads to a regressive tax schedule (meaning that the average tax rate falls with income). When viewed in the context of total income (both labor and nonlabor), the flat rate on wages in combination with no tax on nonlabor income results in a regressive tax. Since higher income taxpayers tend to have more nonlabor income relative to labor income, the payroll tax relative to total income falls as income increases. The ceiling on taxable wages in combination with no exemption under most payroll taxes also leads to a regressive tax schedule because the effective tax rate falls for taxpayers with incomes above the ceiling, since this income is not taxed. For instance, a 10 percent payroll tax on wages up to \$50,000, results in an effective tax rate of 10 percent for employees with wages up to the ceiling but for an employee with \$100,000 in wages, the effective tax rate falls to 5 percent.

Economic Effects

The payroll tax has several important economic effects. First, it may lead to a decline in the overall progressivity of the tax system by introducing a regressive component that may partially offset other progressive components of the tax system. Although the payroll tax has been criticized for being regressive, its defenders argue that given the generally progressive nature of the benefits of most social insurance programs, the overall package, including both taxes and expenditures, is not necessarily regressive. Further, the income tax which typically includes tax preferences, often tends also to suffer from an effective lack of progressivity except at the lowest income level. Second, the structure of the tax may alter the level and mix of employment. The payroll tax increases the overall tax on labor relative to other inputs, which may induce some substitution away from labor to other inputs. This effect is mitigated to the extent its economic incidence has on labor. If the payroll tax is regressive, its introduction leads to an increase in the cost of lower-wage labor relative to higher-wage labor, which may result in some reduction in the number and net wages of lower-wage employees relative to higher-wage employees. On the other hand, for an existing payroll tax, increasing the ceiling increases the cost of higher-wage employees relative to lower-wage employees, which may result in a decline in the relative employment and net wages of higher-wage employees. Social insurance also has an effect on savings.¹³⁴

¹³³See Shome (1982) and Hamermesh (1980).

¹³⁴See Atkinson (1987).

Practices in OECD Countries

OECD countries can be divided into several broad groups with respect to the financing of social insurance programs: six countries have adopted an approach where the financing of social insurance has been integrated with the tax/transfer mechanism, thus moving away from the traditional reliance on payroll taxes to fund these programs. These countries are Australia, Denmark, Iceland, the Netherlands, New Zealand, and Sweden (in this category for employees). Five countries have adopted a hybrid system in which payroll taxes remain important but with one global rate instead of several schedular rates. These countries are Norway, Portugal, Spain, the United Kingdom and, to a lesser extent, Ireland. Thirteen countries follow the traditional approach with social insurance programs financed out of separate schedular payroll taxes with no or low thresholds and ceilings on taxable wages.

Of the countries with the schedular approach, there is a good deal of variation in rates and scope of coverage. In the United States, the social security (old age, survivors, and disability) component of the tax is 6.20 percent, levied on gross wages up to a ceiling with no floor, with the statutory incidence split equally between the employer and employee. The health care component is 1.45 percent and has a different ceiling but otherwise the same structure. The structure in Germany is similar, although the rates are among the highest in the OECD. The social security component of the tax is 9.35 percent and the health component is 6.41 percent. Both taxes have ceilings and no floors, with the statutory incidence split equally between the employer and employee. In both countries, smaller taxes fund the separate disability and unemployment insurance programs, although the structure of these taxes are similar to the structure of the social security and health taxes. Canada, in contrast, at the federal level, has a much less encompassing payroll tax system. It levies a tax on social security of 2.1 percent with a ceiling and statutory incidence split equally between the employer and employee. It levies no tax for health on the employer and a 1.95 percent tax on the employee. It has public unemployment insurance but no public disability insurance.¹³⁵

¹³⁵See Messere (1993), p. 183.

Practices in Selected Developing Countries

Virtually all developing countries have some social insurance system, primarily old age, survivors, disability, and work injury insurance. As in industrialized countries, developing countries finance their social insurance systems using some combination of payroll taxes levied on employees, payroll taxes levied on employers, and supplemental government contributions. In developing countries, however, the organized sector may be relatively small, limiting the size of the payroll tax base. In addition, the payroll tax rate tends to be lower than in industrialized countries. As a result, coverage tends to be less comprehensive than in industrialized countries.¹³⁶

In Latin America, all of the countries have social insurance programs, financed mainly by payroll taxes. In some countries, however, other taxes may supplement payroll tax revenues. In Argentina, for example, a substantial share of revenues from the VAT is earmarked to support the social security system. In Chile and Uruguay, general revenues are used to support the social security system.¹³⁷

In Asia, most countries likewise have social insurance programs, financed mainly by payroll taxes. Most Asian countries, including China, India, Indonesia, Korea, Malaysia, Pakistan, and Singapore, have some form of old age, disability, and death coverage, financed by payroll taxes. India, Malaysia, Singapore, and Sri Lanka have provident funds that operate on a funded basis to provide pension benefits.¹³⁸ These countries also cover sickness and maternity, work injury, and unemployment through pay-as-you-go payroll taxes. In some cases, other revenue sources may also be used to support the social security system.

¹³⁶See U.S. Department of Health and Human Services (1992).

¹³⁷Mackenzie (1988) discusses the Latin American social insurance system.

¹³⁸Datta and Shome (1981) examine these effects of social security in selected Asian countries.

Asset and Wealth Taxes

Business Assets and Receipts Taxes

RUSSELL KRELOVE AND
JANET STOTSKY

- *What role is there for a business assets tax or receipts tax in a tax system?*
- *How can they serve as presumptive or minimum taxes?*
- *What structural issues are critical in designing an assets or receipts tax?*

Some countries levy a tax on the value of a business' assets or on its receipts. These taxes are usually relatively simple compared to a business income tax. Typically, the assets tax is levied as a relatively low percentage of business assets while the receipts tax is levied as a relatively low percentage of receipts. These taxes are sometimes used to supplement or replace other business taxes in industrialized and developing countries, and they may also be used as a business minimum tax in some developing countries. This chapter examines the roles and major characteristics of these two taxes.

Rationale and Application

Countries appear to have adopted an assets tax for different reasons. One rationale for an assets tax is to substitute for a business income tax. It is commonly believed that the economic incidence of a business income tax falls on owners of assets. Thus, an assets tax and an income tax may amount to a tax on the same tax base. It is typically assumed that in a well-functioning capital market with capital mobility, capital migrates to where it receives the highest return. Thus, the average rate of return on capital should vary little from one use to another. A tax based on this average rate of return could, therefore, be a reasonable proxy for an income tax. Nevertheless, despite well-functioning capital markets, it is typically found that rates of return vary across businesses engaged in the same activities and across industries. Consequently, a tax based on an average rate of return on business assets is likely to be an imperfect proxy for an income tax at best.

Another rationale for a business assets tax is to add an element of progressivity to the business income tax. For the assets tax to add to the progressivity of the income tax, it is important to design the tax so that the assets tax liability supplements the business income tax so that businesses with higher income pay a higher overall tax. This is likely to be difficult in practice; thus, it is probably easier to add a progressive rate schedule to the regular business income tax.

Another rationale for a business assets tax is to serve as a business minimum income tax.¹³⁹ An assets-based business minimum tax has a stronger theoretical grounding than one based on some alternative measures of the base, such as gross receipts or turnover, inasmuch as one expects economic income to bear some systematic relationship to assets.

A final reason for adopting an assets tax in the case of state businesses is to enable the state to gain some return on its capital investments. This tax might be seen to substitute for the payment of a dividend to equity owners in private businesses. This rationale for an assets tax would, however, cease to apply if these businesses were privatized.

Many Latin American countries levy assets taxes, using a variety of definitions of the tax base. Mexico, Ecuador, and Argentina levy an annual tax on gross assets.¹⁴⁰ Costa Rica taxes only gross fixed assets. Several other countries, including Bolivia, Colombia, Panama, Peru, and Uruguay use net worth as the tax base.¹⁴¹ Many European countries also have some form of a business assets tax.

Countries also appear to have adopted a gross receipts tax for different reasons. In developing countries, it may be difficult to objectively verify components of revenues and costs. When components of cost are difficult to measure, a tax on cash receipts alone may provide a proxy for a business income tax, although the theoretical grounds for this equivalence are much weaker than for an assets tax. Some developing countries have adopted gross receipts or turnover taxes as minimum taxes. Gross receipts or turnover

¹³⁹See Chapter VI for further discussion of this issue.

¹⁴⁰The Mexican tax became effective in 1989, at the rate of 2 percent. The Ecuadoran tax became effective in 1994, at the rate of 1 percent. Argentina has an assets tax but is converting into a wealth tax.

¹⁴¹See Shome (1992).

taxes are prominent in France and the francophone African countries, often with a minimum amount of tax payable.

Determination of the Tax Base

What should constitute the base?

One critical issue in the design of an assets tax is the choice of a tax base. The tax is generally imposed on a taxpayer's gross business assets, including both current and long-term assets. Current assets may include cash and securities, receivables, and inventories, while long-term assets may include land and other fixed assets at depreciated value, and intangible assets at amortized value. It might be desirable in defining gross business assets to use net working capital (current assets minus current liabilities) instead of current assets, because the amount of current assets might simply reflect some short-term financing decisions. Alternatively, the tax could be imposed only on net assets (gross assets net of debt-financed liabilities) or only on fixed assets.

The choice of which asset measure to use for the tax base depends on a combination of theoretical and practical considerations. From a theoretical perspective, levying the tax on gross assets is appropriate, if the purpose of the tax is to provide a proxy for a broad-based income tax that does not favor debt-financed assets. Levying the tax on net assets (or equity) allows debt-financed assets to escape tax, similar to a business income tax that allows an income tax deduction for interest on debt but not for dividends. A tax on net assets thus favors debt-financed investments. Levying the tax on net assets might also induce taxpayers to align debts with assets included in the tax base to reduce the tax. For this reason, gross assets, rather than net assets, may constitute a more appropriate tax base. Levying the tax on fixed assets is simpler but has less theoretical justification. A tax on fixed assets would tend to discourage investment in fixed assets as opposed to other asset forms.

A gross receipts tax includes in the base the turnover from operations of the business, so that it is equivalent to a broad-based sales tax on business output. The base may, however, be defined in broader terms to include other items of positive cash flow, such as receipts from asset sales or equity sales, and receipts from issuance of new debt. Sales of new equity and issuance of new debt are related to the acquisition of capital, so that a tax on receipts from issuance of equity and debt is closely related to a tax on gross assets. A major difference is the timing of tax payments—a tax on new financing would be paid up front, rather than over the life of the asset.

Valuation Issues

A tax on assets may be difficult to administer because of the inability to measure accurately some components of assets. Assets may pose valuation difficulties for several reasons.¹⁴² First, the value of a business' assets may vary. Second, many assets have long life spans and are not regularly traded in capital markets. Third, inflation distorts the value of assets by creating a divergence between historic and replacement costs. Fourth, some small assets may be sufficiently costly to value that, from a practical point of view, it is not worthwhile to attempt to value them. Fifth, in some cases, it may be difficult to ascertain the ownership of assets. A similar set of valuation problems arise with regard to liabilities.

Current assets pose different valuation problems than long-term assets. Current assets vary more than long-term assets within a short time period. Thus, it might only be appropriate to take an average value for the purposes of the tax. Nevertheless, since current assets are relatively liquid, their value is relatively easy to establish, even in an inflationary environment. Certain components of current assets, such as inventories, are relatively illiquid and hence would pose more of a valuation problem.

Long-term assets pose valuation problems because they are less liquid and infrequently traded. Ideally, fixed assets, such as plant and equipment, should be valued at fair market value, but usually the only available measure of value is historic costs reduced by depreciation. Land, although it is not a depreciable asset, poses a similar problem. Ideally, intangible assets, such as goodwill or patents, should be valued at an arm's-length price that would be established if the business were sold, but usually the only available measure is historic value reduced by amortization. In an inflationary environment, the book value of gross assets may be a poor proxy for the economic value of gross assets. Thus, a tax on assets without any adjustment for inflation could be quite distorting, tending to favor businesses whose assets are somewhat older on average.

Similarly, if the goal is to tax net assets (or equity), it is necessary to have a measure of the fair market value of equity. Unless the stock of the business is publicly traded, this measure will not be available. The book value of net assets may be a poor proxy for its market value.

In principle, it is possible to make some adjustments to balance sheet items to account for inflation. It is possible to adjust certain historical asset values for in-

¹⁴²See Tait (1967).

flation by indexing those assets to price indexes that are appropriate for the asset. The consumer price index can be used to adjust asset values that are likely to reflect overall price levels, such as machinery, equipment, and structures, if no asset-specific indexes are available. It is not, however, appropriate to use the consumer price index for land, since its value often changes in response to demand and supply characteristics of a local market that bear little relationship to overall price changes. An index of land or real estate values is more appropriate to use in this instance. It is much more difficult to adjust the value of intangibles in any accurate fashion.

A receipts tax avoids many of the valuation problems that arise under an assets tax, especially the problems arising from the mismeasurement of cost in an inflationary environment. Receipts respond on average proportionately to prices, so that tax revenue grows with prices.

Double taxation

Double taxation of certain assets is potentially a problem, if taxable businesses own financial interests in one another. Businesses may either own equity in or make loans to other taxable businesses. If the purpose of the assets tax is to serve as a proxy for an income tax on real and financial flows, then the assets should be taxed on any flows that they generate, so that it is appropriate to include both the financial assets and the tangible assets that they finance in the tax base. On the other hand, if the purpose of the tax is to serve as a tax on real flows, then the assets should only be taxed once. There are two ways to reduce the possibilities of double taxation: either by allowing the business that owns the equity or makes the loan to other businesses to deduct those assets from its taxable base or by allowing the business that has issued equity to or borrowed from other businesses to deduct those liabilities from its taxable base. If the purpose is to tax real flows, it seems more logical to allow the business that owns equity in or makes loans to other taxable businesses to deduct those assets from its taxable base. Under the Mexican assets tax, however, the business that borrows from another taxable business is allowed a deduction. Thus, either arrangement is possible.

A variation of this problem arises if businesses own subsidiaries or other businesses that are taxable. In this case, the base should include all assets of the business, but not assets of subsidiaries or other taxable businesses. The Mexican assets tax has provisions to avoid double taxation of intercorporate ownership.

Timing of valuation

Another issue in the design of the tax is when to value the assets for the purposes of determining the tax liability. A business's holdings of assets are likely to fluctuate over the course of a year. One possibility is to require a business to calculate average holdings of each type of asset over the year. A more precise method is to require a business to calculate a weighted average of its holdings of each type of asset, with the weight being the proportion of the year it held the asset. Another possibility is to choose one day of the year, such as the last, for determining the value of each type of asset held.

Under the Mexican assets tax, the tax base is defined as the average value of the taxpayer's assets over the year. In general, the value of the assets is equal to the sum of monthly averages of financial assets divided by the number of months in the period plus the average of investments in land, other fixed assets, and intangible assets plus the average of inventories minus the average of liabilities after specified reductions.¹⁴³

Liquidity considerations

The presumption under the income tax is that profit generates the liquidity to finance the payment of tax. Liquidity may be a greater problem under an assets tax. A business may face difficulties paying its assets tax liability if the value of assets is changing quickly and there are constraints on the taxpayer's ability to borrow against the value of the assets. This situation is most likely to arise when the assets have low current yields. Instead of forcing businesses to sell assets to meet tax liabilities, one possibility is to allow the tax to accrue until the asset is sold or until, for other reasons, the liquidity constraints have been relaxed. It is possible to adopt an averaging provision to limit the liquidity problems, as was done with the Mexican gross assets tax.¹⁴⁴ Finally, in certain circumstances, it may be expedient to exclude from the definition of the assets tax base those assets that are most likely to lead to liquidity problems for taxpayers. Liquidity problems are less likely to arise under a receipts tax.

Transfer pricing

Multijurisdiction companies benefit from the possibility of using transfer pricing to minimize taxes. The possibilities for such transfer pricing depend on the form of tax. Under a gross assets tax, the incentive to choose output and input prices strategically is diminished, especially when that base consists mainly of

¹⁴³See McLees (1991).

¹⁴⁴See Shome (1992).

tangible assets.^{145,146} Under a gross receipts tax, the incentives on the cost side are removed, but there is still an incentive, in internal transactions, to understate the selling price when the seller is located in a jurisdiction levying such a tax.

Determining a threshold for liability for taxation

Usually, corporate income tax is payable on taxable income, independent of the size of the firm, although small firms sometimes face a lower tax rate. Under an assets tax, businesses with a relatively low value of assets may be exempted from the tax. This feature would serve to introduce an element of progressivity into the tax and reduce the number of taxpayers subject to this tax. With sales taxes, for example a VAT, small traders are generally excluded for administrative reasons, usually by a turnover floor. A similar rationale can be adopted to support a turnover floor for a receipts tax, although the appropriate floor would be lower than the corresponding floor for the VAT, since turnover is larger than value added.

Determination of the Tax Rate

The tax rate that is chosen should reflect the objectives of the tax. If revenue is an important objective, the tax rate should be set high enough to generate the desired amount of revenue. If the main objective is to ensure a minimum contribution to the exchequer by businesses, then the tax rate should be set high enough to yield revenue from businesses with economic income but not so high as to impose undue burden on businesses with economic losses. This would suggest a relatively low rate.

The appropriate tax rate on an assets base depends in part on which assets are included in the base, the expected real rate of return on business assets, the regular business income tax rate, and the debt-equity ratio of the business. If the tax applies to gross assets and is intended to be a proxy for a broad-based income tax or minimum tax on income, then with an expected real rate of return of p and a business income tax rate of τ , the tax rate should be $t = \tau p$. Sadka and Tanzi (1993) suggest that for setting the tax rate on a gross assets base, it might be desirable to treat the business as though it were entirely financed by debt so as to avoid biasing investment against equity financing. With an expected real rate of return of p and

a real rate of interest of r , the presumptive profit is $p-r$ per unit of gross assets (after allowing for imputed interest on equity) and the tax rate on gross assets should be $t = \tau(p-r)$. Similarly, if the tax is intended to be a minimum tax on equity, then the rate would depend on the debt-equity ratio of the business. For example, if the debt-equity ratio is 1, then the tax on equity might be twice the equivalent rate on gross assets, after allowing for a deduction for debt in the measurement of the tax base.

With a gross receipts tax, the tax rate can be chosen to mimic on average the impact of the income tax, by using for all firms the average ratio of sales to income. If the ratio of taxable income to receipts is b , and if the corporate tax rate is T , then the tax rate on receipts should be $t = bT$. But this would impose a substantial burden on loss-making companies.

Risk-Sharing Characteristics of the Various Taxes

Risk-sharing characteristics of the three taxes differ. In Chapter II, the distinction was made between income risk and capital risk, the former applying to uncertainty in output and current input prices, and the latter arising from uncertainty concerning physical depreciation of capital and also in replacement costs. As previously discussed, an income tax that allows only partial or no offset for losses tends to penalize the bearing of income risk relative to a tax that allows full loss offset. In addition, when depreciation for tax purposes is based on historical cost, the government does not share in capital risk under an income tax. Asset taxes based on market value do not share in income risk, but they can, if appropriately designed, be neutral with respect to capital risk. When asset prices rise, asset tax collections based on market value increase, and conversely, when asset prices fall, so do asset tax collections. For asset valuation based on some rule, the degree of sharing of capital risk depends on how the rule responds to changes in physical depreciation of the asset and to variations in the replacement cost of capital. For a receipts tax in the form of a tax on turnover of the firm, tax revenue fluctuates with output prices, but does not respond to variation in input prices or in the gains and losses on the capital of the firm. Thus a turnover tax does not share in all income risk, or in capital risk.

¹⁴⁵When the base is net assets, there is an opportunity to manipulate the location of liabilities to allocate the tax base to low-tax jurisdictions.

¹⁴⁶That there are reduced opportunities for transfer pricing when gross assets is the base is recognized in the corporate tax systems in federal countries (e.g., the United States and Canada) where the allo-

cation of a firm's taxable income to the various subfederal jurisdictions in which it operates is determined by a formula that involves, *inter alia*, the distribution of the firm's assets among those jurisdictions.

Taxation of Land and Property

JANET STOTSKY AND M. ZÜHTÜ YÜCELİK

- *What is the rationale for property taxation? Under what forms can it be applied?*
- *What techniques should be used for valuation of taxable property? Why do the effective rates differ from statutory rates?*
- *What are the arguments for betterment levies?*
- *What is the incidence of property tax?*

Taxes on land and property are among the oldest and most common forms of taxation. Although property taxes typically constitute a minor source of revenue at the central government level, they may contribute substantially to the financing of local public services. In 1992, property taxes ranged from less than 1 percent to more than 7 percent of total revenue in industrialized countries. Their share in total revenue also varied across developing countries in a similar fashion.¹⁴⁷

Rationale for Property Taxation

The taxation of land and property may be justified on the grounds of both the benefit and ability to pay principles of taxation. Benefit considerations point to various kinds of *in rem* property taxes. One may argue that the protection provided by the state for private property through the maintenance of general law and order justifies the imposition of a tax; or more narrowly, one may argue that the construction of a road adjoining the property confers a benefit for which a tax might be charged. Generally, however, the application of the benefit principle of taxation is justified when it can be shown that the value of the benefits of publicly provided goods equals the tax yield. This proposition is hard to establish, but would be most likely to hold true at the local government level.

Ability-to-pay considerations suggest that the holding of property not only implies an *ad personam* tax capacity to receive property income but also implies an inherent form of potential consumption. A property tax may be a useful part of the tax system to the extent that either rental income or imputed rental income from property are not captured by the personal income tax.

Forms of Property Taxation

There are three basic forms of property taxation: (1) a tax based on the annual or rental value of the property; (2) a tax based on the capital value of the land and improvements; and (3) a tax based on the site (or land) value (which is essentially a type of capital value tax). Some tax systems may use a combination of methods.

Under the annual value system, the tax is based on an estimate of the annual net rental value from the use of the property. Net rental value is usually derived from income flows, with some adjustments, or from capital values.

Under the capital value system, the tax is based on the assessed value of land and improvements. Practice varies with respect to the assessment of capital value. In some countries, land is assessed separately from improvements while in other countries, land and improvements are assessed together.

In theory, the discounted stream of net rental payments should be equal to the capital value of a property. Thus, the annual value and capital value methods should yield equivalent tax bases. In practice, the two tax bases may not yield equivalent values for several reasons. First, since the capital value is based on expected future flows of income from the property, differences in expectations may result in differences between annual value and capital value. Second, both methods use assessment practices that are frequently ad hoc and inconsistent. Thus, for the property, net rental value may be different from market rental value and capital value may be different from market value.

The site or land value system includes only the site value in the property tax base, excluding improvements, such as houses, factories, and crops. It is applied in a number of countries, including Kenya, Taiwan, Australia, New Zealand, and South Africa. "Site value" is different from "unimproved land value," in that it includes the value of drainage, leveling, timber clearing, and similar site improvements. The main disadvantage of this form of property taxation is that it narrows the tax base compared to the other forms of property taxation and thus requires higher tax rates to produce the same revenue. It may also be difficult in the case of land upon which structures have been built; the value of the land has to be separated from the value of the structure. But the main advantage is that in rural areas, it may be simpler to administer than a property tax.

¹⁴⁷See International Monetary Fund (1992), pp. 42–43.

Taxation of Agricultural Land

Taxation of agricultural land represents the oldest form of property taxation, although the relative importance of this tax has declined over time. One variant of a property tax applied to agricultural land is a tax based on land area. A flat rate is applied to each unit of land area irrespective of its annual rental value or capital value. Some land taxes may apply differential rates to land distinguished by quality or the availability of irrigation, as in Nepal.¹⁴⁸ The advantage of this approach is its simplicity. The main disadvantages are that land area may bear little relation to land value and in a highly inflationary environment, this tax may quickly lose its value unless the nominal amount of tax applied to a unit of land is regularly adjusted upward.

Valuation Problems

Property is a heterogeneous good. Its value reflects economic, social, physical, and legal factors. Economic factors include the level of income in the community, taxes and other prices, the proximity to centers of business activity, and the availability and quality of public services. Social factors relate to the availability of cultural and recreational facilities. Physical factors relate to the characteristics of the land, such as soil quality and size, characteristics of any improvements, and characteristics of the environment. Legal factors relate to public and private restrictions on the use of the property, including rent control and zoning regulations. These characteristics of the property may be partly or completely capitalized into the value of the property.

Accurate assessment is the benchmark of a good property tax administration. The purpose of assessment is essentially to determine the "fair market rental" or "fair market value" of the property. Accurate assessment under any system of property taxation requires an active property market. The annual value method requires an active rental market so as to provide information on rental values, while the capital market method requires an active market in which property is bought and sold so as to provide information on capital values. Urban areas typically provide active markets in property, while rural areas may not, thus making assessment more difficult in rural areas.

Owner-occupied property that is neither rented nor sold regularly may pose a valuation problem for both the annual and capital value methods of property taxation since no explicit rent or capital value is observed but must be imputed from information derived from

property with similar characteristics. Business property may also pose valuation problems since rental rates are frequently negotiated.

In practice, the assessed value of a property is generally set below its fair rental or market value because of exclusions and exemptions from the base or because methods of assessment are used that are not based on full property valuation. In addition, infrequent assessments and poor assessment practices contribute to differences between assessed value and fair market value. Arbitrary differences between assessed values and fair market values may create inequities in the property tax and contribute to the unpopularity of the tax. In environments characterized by high property price or general price inflation, if assessments are not conducted frequently, this may lead to erosion of the tax base and make the property tax an inelastic source of revenues.

As an alternative to regular assessment, it is possible to use a price index that is appropriate for the asset as a guide to changes in value. A construction price index may serve to measure changes in the value of the structural component, while a land value index may be appropriate to use for the land component.

The existence of rent control may complicate the assessment of property value because it may reduce the level or growth of rents or assessed value. A reduction in property value from rent control may lead to a considerable loss of tax revenue.¹⁴⁹

Under the annual rental value system, there are two main methods for measuring the tax base. The first method assesses the income-producing capacity of each class of land or property, based on standardized classifications and other information; and the second method assesses the capital value either based on sales of the property or comparable property, or based on alternative official appraisal standards, and derives the annual value by applying an assumed rate of return on the capital value.

Under the capital value system, there are three main methods for assessing property value. The most common method bases assessments on sales of the property or comparable property. This method requires an active market to provide sufficient observations on properties with different characteristics to yield a value for each characteristic. It is then possible to derive a value for properties with different combinations of characteristics by aggregating the value of each of the separate characteristics. With sufficient observations, it is possible to apply formal statistical techniques,

¹⁴⁸See Bird (1974).

¹⁴⁹See Bahl and Linn (1992).

known as hedonic analysis, to yield highly accurate assessments. A second method uses observations on annual rental streams and converts this rental stream into a capital value using an appropriate rate of discount. A third method develops an estimate of how much it would cost at current input prices to replace a piece of property in its existing condition. This method may not, however, be used for land valuation, since land is irreproducible.

For the assessment of agricultural land, the most accurate method is the capital value approach. The annual rental value method is limited by the frequent absence of rental information and the replacement cost approach is inapplicable. Taxation of agricultural lands based on capital value, in contrast to annual rental value, is less likely to be considered as a tax in lieu of income taxes in the agricultural sector. Thus, it facilitates the expansion of the income tax to the agricultural sector.¹⁵⁰

Rate Structure

Property tax systems vary in terms of their rate structure. They may apply either a flat or progressive tax rate schedule to assessed value. A flat rate offers the advantage of simplicity and minimizes the opportunity for taxpayers to bargain with tax authorities to reduce their tax liabilities. Effective tax rates are often well below the statutory tax rates because property is typically assessed below its fair market value. The ratio of assessment to fair market value tends to vary widely from place to place and over time, thereby making it difficult to compare effective tax rates on property on the basis of the statutory rates alone. Typically, however, statutory tax rates are in the order of 1–3 percent, while effective tax rates are even lower.

Exemptions

Most property tax systems exempt properties belonging to the government, local authorities, charities, religious institutions, and foreign embassies. In some countries, owner-occupied properties are exempt from the tax under the rental value system or are subject to reduced rates. With respect to agricultural land taxation, improvements are generally exempt from the tax and preferential treatments are granted to promote the use of fertilizer, cultivation of specific crops, and land reclamation ventures.¹⁵¹

Betterment Levies

Betterment levies (or special assessments) attempt to apportion the cost of public investments to properties benefiting from these projects. They are generally levied for a specific purpose and their application is limited to those property owners considered to be direct beneficiaries of public investments.¹⁵² Such projects include irrigation systems, new roads, or urban renewal projects.

One variation on the betterment levy is the valorization tax, which was extensively applied in Colombia. Municipalities used this tax to recoup the cost of the municipal projects, such as the construction of new streets and sewers, widening and paving of existing roads, lighting of streets, tree plantings, and so on. Rural areas used this tax to recoup the cost of highway, flood control, and land reclamation projects undertaken by departments and regional agencies.¹⁵³ Municipalities and other local authorities were allowed to assess and collect the valorization tax upon approval of the projects involved. Property owners were given the right to be consulted in the conception and realization of the project and in the allocation of the proceeds of the tax. This levy contributed significantly to local government finances in Colombia and made possible several extensive infrastructure projects. For the period 1959–63, valorization tax proceeds in Colombia represented, on average, 38.6 percent of property taxes, 16.1 percent of municipal tax revenue, and 6.2 percent of municipal current revenue.¹⁵⁴

Role of Cadastre in Property Taxation

An effective implementation of the property tax requires information on all property, including its physical size and boundaries, ownership, and the value of land and improvements. These requirements can be satisfied through a reliable set of titles, ownership records, and cadastral surveys. The "cadastre" consists of an official record of the location, size, and ownership of each parcel of land. A tax cadastre also includes the information needed for property taxation, such as the value of the land and improvements. The cadastre provides the tax officials with information on taxable properties and addresses of liable taxpayers. Therefore, a reliable cadastre is essential for an effective administration of a property tax.¹⁵⁵ A reliable cadastre is a task which may take a number of years, but once prepared, and thereafter regularly updated, it will

¹⁵⁰See Bird (1974).

¹⁵¹*Ibid.*

¹⁵²See Becker (1969) and Bird (1974).

¹⁵³See Bahl and Linn (1992), and Becker (1969).

¹⁵⁴See Becker (1969).

¹⁵⁵See United Nations (1968).

recoup its cost many times over in improved assessments and higher tax revenues. In the absence of a reliable cadastre, it is still possible to administer a property tax by using block valuation and applying a common property value to all property within a block. This method works best when property is relatively uniform within a block. It is still possible to allow variation under this method by requiring property owners to justify any deviation of their property value from the value assigned to property in the block.

Incidence of the Property Tax

The old view of the incidence of the property tax was that the component of the tax that falls on land is largely borne by owners of land since land is perfectly inelastic in supply. Since landowners tend to have higher income, this component of the tax is progressive. The component of the tax that falls on structures is borne by both the supply and demand sides of the market because structures are more elastic in supply. Since renters tend to have lower income, this component of the tax is less progressive in incidence or even regressive. Thus, under the old view, the property tax tends to be at best proportional and possibly regressive. The new view of property tax incidence is that the tax falls on all owners of capital through movements of capital from high-taxed sectors to low-taxed sectors. Since owners of capital tend to have higher income, the new view maintains that the property tax is progressive. Empirical evidence on property tax incidence is inconclusive.¹⁵⁶

Taxation of Bequests, Inheritances, and Gifts

M. ZÜHTÜ YÜCELİK

- *What are the policy objectives of transfer taxation and under what forms can they be achieved?*
- *How should the rates, taxable bases, and exemptions be established to attain policy objectives?*
- *What is the revenue importance of transfer taxes in selected industrial countries?*

Taxes on property transferred at death have always been considered an appropriate object of taxation and are among the oldest forms of taxation. They appeared

first during Roman times in 6 A.D. and were called "vicesima hereditatum."¹⁵⁷ These levies are imposed as a matter of social philosophy and as a policy instrument to adjust the distribution of wealth and to generate revenue for the Treasury. These taxes may be imposed as an estate tax or as a gift tax on the donor, or as an inheritance tax on the heirs. The United States, the United Kingdom, and other Commonwealth countries apply estate taxes, whereas other European countries apply inheritance taxes.¹⁵⁸

Objectives of Transfer Taxation

A country may have various social and economic objectives in imposing death taxes: first, to limit one's right to dispose of one's wealth at death; second, to limit one's right to acquire wealth by way of bequests, without "own effort," which is considered a windfall; third, to establish an alternative to the taxation of capital income during the recipient's lifetime; in this way, it may be possible to avoid a highly progressive taxation of capital income and to reduce its disincentive effects on saving and investment; fourth, to redistribute wealth; and fifth, to generate revenue for the Treasury. Taxes on *inter vivos* transfers (gifts) may serve to prevent the transfer of wealth prior to death so as to avoid death taxes.

The relative importance of the objectives to a given country shapes the form of taxation of transfers, its rate structure, and level of exemptions.¹⁵⁹

Forms of Transfer Taxes

Transfers at death may be taxed in three forms: (1) as an estate tax imposed on the entire estate left by the testator without any reference to inheritors; (2) as an inheritance tax imposed on individual shares of inheritors; and (3) as an accessions tax, which is a unified tax on the donee with progressive rates on the total value of bequests and gifts received during the lifetime. Ireland is the only country to impose a true accessions tax. The Irish system requires full integration with lifetime aggregation of gifts and inheritances from any donor (before 1984, only aggregation by each donor was required). France also requires full integration with lifetime aggregation of gifts and legacies only with reference to transfers between a recipient and each donor separately.¹⁶⁰

¹⁵⁷See Eatwell, Milgate, and Newman (1988).

¹⁵⁸See Musgrave and Musgrave (1989); and Shoup (1965).

¹⁵⁹See OECD (1988) and Tait (1967).

¹⁶⁰See Tait (1967).

¹⁵⁶See Aaron (1975).

The estate tax is fairly simple to administer as it is levied on the entire estate of the testator. It emphasizes the objective of reducing the concentration of wealth. Large exemptions and undervaluations observed in practice create a substantial tax avoidance. "Generation skipping" is another avenue of avoidance, by which the testator leaves his or her estate to grandchildren with the objective of reducing the number of times an estate changes hands, and hence the number of times the estate tax can be levied. The creation of trusts and *inter vivos* gifts are other ways of reducing the estate tax. A gift tax thus complements an estate tax.

Inheritance taxes are more difficult to administer as they require the valuation of individual shares. But they may be better adapted to the ability to pay of inheritors.¹⁶¹ Accessions taxes are the most difficult to administer as they potentially require the valuation of a series of gifts or inheritances.

Rates and Exemptions

Estate and gift tax rates are generally progressive. In the United States, estate and gift tax rates were unified in 1976 at levels from 18 percent to 70 percent. New Zealand has a single 40 percent rate. In the United Kingdom, the rates vary between 30 percent and 60 percent. The estate tax threshold is \$600,000 in the United States and the equivalent of \$235,000 in New Zealand and \$104,000 in the United Kingdom. The estate tax treats all inheritors the same with respect to the application of the tax, although certain exemptions may apply. In New Zealand, the matrimonial home is entirely exempt for social policy considerations. In the United States, an unlimited exemption is granted to spouses. In Germany, an exemption on the first DM 40,000 is granted for spouses, children, and grandchildren, and DM 10,000 in other cases.¹⁶²

Inheritance tax rates are also generally progressive and differentiated according to the beneficiary's relationship to the deceased. Exemption thresholds may also be differentiated for the same purpose. Most commonly, three or four different rate scales exist. Japan and Ireland have a single scale with different thresholds for beneficiaries.

Spouses and children are usually the most favored class, while nonrelated beneficiaries are more heavily taxed. Their initial rates are five to eight times greater than the rate applied to spouses and children. The argument here is that for an unrelated beneficiary, an inheritance is generally a windfall, whereas for close

relatives, particularly the spouse and children of the deceased, an inheritance is expected. In many countries, close relatives have a legal right to inherit some portion of the estate regardless of their wealth.¹⁶³ This treatment is justified on grounds of social policy, which aims at supporting the family unit as an institution rather than by reference to the principle of horizontal equity. It is possible to derive certain equivalences between estate, inheritance, and gift taxes. For instance, if tax rates are flat, taxation of the estate or of individual shares of heirs yields equivalent tax burdens. If the rates are progressive, then these two kinds of taxes may not yield equivalent tax burdens. With progressive rates, an estate would yield a higher revenue than an inheritance tax as long as the estate was not distributed to one heir. But even with progressive taxes, the tax yield would be the same if the estate were distributed to one heir. Even equivalent tax rates may not yield equivalent tax burdens if the taxes are levied at different times, resulting in different tax burdens in present value terms.

Tax Relief for the State, Charities, and Political Parties

Property given or bequeathed to the state and to other government institutions is generally exempt from death taxes. Transfers to charities which are of public benefit are generally granted exemption or substantial relief. In some countries, relief is limited to domestic charities; in others, foreign charities also qualify unilaterally or on a basis of reciprocity. In Austria, Germany, the Netherlands, and the United Kingdom, gifts and bequests to political parties are given relief, while in Ireland, they enjoy full exemption.

Treatment of Residents and Nonresidents

Death taxes are levied on all the property of deceased persons who are resident or domiciled in the country imposing the tax. Resident beneficiaries are taxable on all property situated within or outside their country of residence that they inherit from the deceased persons resident or domiciled in the taxing country. Nonresident beneficiaries are taxable only on property situated in the taxing country.

But foreign property which forms part of the estate of a nonresident is normally not taxable even when it is received by a resident beneficiary. This rule does not apply in Germany and Japan because residents are taxable on foreign property inherited from nonresidents.

¹⁶¹See OECD (1988).

¹⁶²*Ibid.*

¹⁶³See OECD (1988).

Not all countries charge all the property of a deceased resident. In Finland and Luxembourg, immovable property situated abroad is not taxable. With respect to nonresidents, the tax does not extend always to all his property situated in the taxing country. In Denmark, Belgium, and Luxembourg, it is limited to immovable property situated within their borders.¹⁶⁴

Treatment of Selected Assets

Some exemption for household and personal effects is common. In New Zealand, all household and personal effects, jewelry, and works of art are exempt from estate tax if passed to a spouse; the same exemption applies to gifts between spouses for gift tax purposes.

The argument used for such exemptions and reliefs are the need to avoid some troublesome valuation work and hardship which may be caused by taxing nonincome-producing assets, which the survivors need for their personal use and do not intend to sell.

Works of art and collections are given exemption or favorable treatment in the public interest. Germany extends such treatment to works of art or immovable property if their preservation is in the public interest. In Ireland, these assets are granted tax relief if they remain within the country and are made accessible to the public.

Pension rights and annuities are exempt in many countries. In France, a pension commencing on death is taxable but annuity passing by survivorship is exempt.

Productive assets are granted special reliefs. Agricultural land and forestry enjoy reliefs for death tax purposes such as 50 percent reduction in value for farmland in Ireland and the United Kingdom and 75 percent reduction in France. Reliefs for transfer of agricultural assets are intended for economic and social reasons, such as preventing fragmentation of the farmland which may lead to inefficiency, as well as preserving agricultural families in their farmlands.

Specific reliefs are also granted to industrial and commercial enterprises owned as a family business. For example, in the United Kingdom, a 50 percent reduction is allowed on the value of a sole proprietor's business or a partner's interest in the partnership. Similar concessions are granted in Finland and the United States.¹⁶⁵

Valuation

For transfer tax purposes, property is valued at its market value at the date of transfer. For an estate tax, the date of death is the natural rule. In case of inheritance taxes, actual date of acquisition of the inheritance is logically more appropriate, but, in practice, valuation at the date of death is the rule in many countries, except in Denmark and Ireland, where the relevant date is the actual date of transfer. Cadastral values of immovable property are used in Portugal and Spain. In other countries, immovables may be valued by the tax department.¹⁶⁶

Life interests, annuities, and other income interests are usually valued at a multiple of the annual income according to the age of the beneficiary, based on a statutory table prescribed for the purpose.

As for the valuation of unincorporated businesses and shares, the principal factors which may be taken into account are the going-concern value of the business, the assets value, the liquidation value, the earnings yield, and the dividend yield. A liquidation basis of valuation is appropriate for shares in a bankrupt company. With respect to a profitable trading concern, the company's estimated maintainable profits are capitalized at a rate commensurate with the risk to capital involved.

In some cases, taxpayers declare assets at their own valuation, which are then subject to review by the tax authorities. Wide divergences occur naturally between the values put upon an asset by the taxpayer and the tax authorities. The taxpayer may be tempted to declare values which are unrealistic by any standard to reduce the tax liability. The size of such evasion depends on the resources which the tax authorities are able to devote to review the taxpayers' valuations.

In extreme cases, some assets are altogether omitted. Personal effects (including jewelry) and securities in bearer form are the most frequently and easily concealed types of assets. Practice of such tax evasions depends also on the general attitude of taxpayers toward tax evasion.¹⁶⁷

Effects on Saving and Investment

An estate or inheritance tax may affect a donor's saving behavior in two ways. On the one hand, it may induce donors to save more to compensate for the income effect of the tax on after-tax bequests. Alternatively, it may lead the donor to substitute lifetime con-

¹⁶⁴See OECD (1988).

¹⁶⁵Ibid.

¹⁶⁶See OECD (1988).

¹⁶⁷See Goldstein (1991) and Tait (1967).

sumption for bequests because the price of leaving a legacy has increased. By reducing the amount of inheritance for a potential heir, an estate or inheritance tax may stimulate the desire of inheritors to work and save both before and after an intergenerational transfer. A tax at death may also encourage entrepreneurs and investors to place much of their wealth in trusts or donate to charities. Furthermore, by increasing the demand for liquidity, death taxes might bias portfolio compositions toward more conservative investments.

Since most capital transfers occur at death, a tax at death may create fewer distortions in the type of investment decisions of a potential donor over his lifetime than a comprehensive income tax.¹⁶⁸

Revenue Importance of Death Taxes

Death and gift taxes represent a minute percentage of GDP in industrial countries. Several countries recently reduced property transfer taxes (e.g., Canada, the United Kingdom, and the United States), on the grounds that they fell too heavily on agriculture, private business, or both. Tax revenue growth in France is explained by the substantial increases in the rates of inheritance tax by the socialist government in 1982. The increase in Japan is explained by the rapid growth in national wealth associated with the high savings ratio of its citizens.¹⁶⁹

In the United States, the estate tax was first introduced in 1916 with rates ranging between 1 percent and 10 percent. The top marginal rate was gradually increased, reaching 77 percent in 1940. A separate gift tax was introduced in 1924 with rates between 1 per-

cent and 25 percent. Gift tax rates also increased gradually but they always remained below those of the estate tax.¹⁷⁰

In 1976, the following several major changes took place: (1) unifying the gift and estate taxes (with rates from 18 percent to 70 percent);¹⁷¹ (2) introducing a comprehensive levy on generation-skipping transfers; and (3) expanding the marital deduction.

Even after allowing for large tax reliefs and differentiated rates for social policy considerations, the revenue yield should have been higher than observed today in the United States. Of the \$123 billion of wealth slated to be transferred at death in 1986, only \$36 billion was included on estate tax returns and \$6 billion paid in taxes, resulting in an effective tax rate of 5 percent.¹⁷²

Wealthy people avoid the transfer tax through an array of estate planning techniques while maintaining full control of their assets. Placing a low value on wealth already accumulated may be a primary method of tax avoidance. To some extent, tax avoidance affects real economic behavior, such as the nature of investments or property use. In most cases, however, tax avoidance consists of hiring legal experts to arrange property rights in appropriate ways. In 1992, some 16,000 lawyers in the United States were specialized in trust, probate, and estate law. Accountants also engage in estate planning market. Moreover, taxpayers spend considerable efforts on avoidance schemes.

¹⁷⁰The estate tax rates, however, apply to the gross estate, and the gift tax rates, to the net gift. That is, the gift tax base excludes the gift tax while the estate tax is paid out of the estate.

¹⁷¹See Aaron and Munnell (1992).

¹⁷²*Ibid.*

¹⁶⁸See OECD (1988).

¹⁶⁹See Aaron and Munnell (1992).

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TAXATION AND THE OPEN
ECONOMY

International Trade Taxes

JULIO ESCOLANO

- *Which are the arguments for and against tariffs?*
- *Are tariff rates a good measure of the degree of protection?*
- *What is better, a single rate or a multiple rate tariff?*
- *How can exporters be insulated from the increase in their costs caused by tariffs?*
- *Is there any reason to tax exports?*

The last two decades have witnessed many instances of successful growth strategies in developing countries. All of them involved the implementation of outward-oriented trade strategies—lowering trade barriers, removing disincentives to exports, and implementing currency convertibility. Among developing countries, those that adopted strongly outward-oriented trade policies showed consistently better economic performance than those whose policies were inward oriented or only moderately outward oriented.¹ In 1974–92, developing countries with strongly outward-oriented trade policies experienced, on average, an annual real per capita GDP growth of 6 percent and an increase in factor productivity of more than 3 percent. In contrast, the set of all developing countries experienced, on average, 1.6 percent real per capita GDP growth and about 1 percent factor productivity growth.

In the industrialized world, notwithstanding the success of outward-oriented trade strategies implemented by many developing and industrial countries, the 1970s and 1980s have also witnessed increasingly negative attitudes toward free trade. The dismantlement of trade barriers among industrial countries fostered unprecedented global economic growth in the postwar period. In contrast, the slowdown in growth and productivity, the re-emergence of large external imbalances, and higher levels of unemployment have been accompanied—and deepened—by heightened protectionist pressures. Although tariffs have remained low in industrial countries,² other nontariff barriers have gained im-

portance since the mid-seventies. These barriers include, inter alia, quotas, antidumping and countervailing measures, competitive subsidization of agriculture, and “voluntary” export restraints.

In this context, the renewed interest in the theory of international trade and the wealth of new and old arguments introduced in recent years is not surprising. While the new theories of economic growth have tended to highlight the positive role of trade in fostering innovation, competition, and productivity, the theories of managed trade and strategic trade have been, to some extent, supportive of the new protectionist policies. This chapter concentrates on the fiscal dimensions of international trade taxes without attempting an exhaustive coverage of the wider field of trade policy.³

Free Trade and Protectionism

The Case for Free Trade

The traditional argument in favor of free trade goes back to the origins of economic science and to the ideas of Adam Smith and David Ricardo. International trade can be considered just another transformation activity available to the national economy: exports are transformed into imports according to their international relative prices. From the viewpoint of the consumers, international trade expands the set of goods and services that they can afford, either by reducing their price, or by making new commodities available, or by a combination of both. From the viewpoint of efficiency in production, free trade allows and encourages specialization in activities and technologies in which the country possesses a comparative advantage. The product of these activities can then be traded for those commodities for which domestic production is relatively inefficient. Thus, free trade allows a better allocation of resources with the corollary that welfare is enhanced. It is worth noting that a country will achieve a higher welfare with free trade than with protection, even if its trade partners engage in protectionist policies. This classical argument in favor of free trade is

¹For a more detailed analysis and statistical data, see International Monetary Fund (1993).

²Successive rounds of multilateral trade negotiations reduced average tariffs for manufactured goods among industrial countries from 40 percent in the period immediately following World War II to 5 percent after the Tokyo round in 1979. Most of this reduction took place in the early years of the postwar period.

³For analyses of recent developments in international trade policies, see Kelly and McGuirk (1992), Bhagwati (1988), World Bank (1987), Corden (1987), International Monetary Fund (1993), and Kelly et al. (1988).

based on the same foundations as the case for market allocation of resources and against government intervention in the price setting process—import tariffs and protectionist practices are just a particular case of price distortions and restrictions to trade. Like the argument for free markets, it remains at the core of mainstream economic theory and has undergone many refinements.⁴

Many economists, however, believe that the classical argument for free trade does not capture some of the main gains that a country can obtain from free trade policies. Conventional arguments for free trade are static in nature while there is a widespread belief that international trade and economic growth are closely related. The new theories of economic growth seek to identify those policies and elements of the economic environment which are key to achieve, not only a more efficient use of existing resources, but a higher rate of output growth in the long run. In the traditional theory of growth, the removal of inefficient policies, such as barriers to trade, could prompt a one-time upward shift in the level of output but could not affect its long-term growth rate. In contrast, recent growth theory shows how free trade can significantly contribute to increase permanently the growth rate of an economy.⁵

Recent analytical and empirical developments have identified a variety of sources of economic growth. The main emphasis has been in the role of human capital accumulation, learning by doing, investment in research and development, and expansion of the span of available products. These factors have the potential to enhance the use of available resources, such as labor and nonhuman capital, reversing the tendency toward diminishing marginal returns. Moreover, some of these newly analyzed factors seem to exhibit positive externalities which produce increasing returns to scale at the macroeconomic level.⁶

Open trade policies allow individual countries to profit from growth enhancing factors. Imports of intermediate products may embody advanced technology and are the result of human capital accumulation and research and development investments realized elsewhere. Closer economic links increase the transmission of new technologies. Expanded competition forces domestic firms to accelerate the pace of absorption of new technologies and devote adequate re-

sources to develop new or improved products. Access to world markets permits a wider diversification of output as well as a larger span of available inputs.

Protectionist policies also implicitly hamper exports. An increase in import tariffs can result in an exchange rate appreciation. The preferential treatment they afford to import-substituting industries reallocates resources toward production for the protected domestic market and away from export-oriented industries. Also, an important part of the bias against exports takes the form of general increases in costs and low productivity of factors.

Arguments in favor of protectionist policies generally assume an unrealistically enlightened government that will be able to choose the right industries to protect and that will manage trade and domestic policies in an optimal manner over time. In practice, governments have not been very successful in “picking winners”—determining which industries to support—because this depends on details of production technology and market structure which governments typically know little about.⁷ Trade policies often get heavily influenced by special-interest politics rather than consideration of national costs and benefits. Even when initially based on sound economic theory, protectionist policies create powerful special-interest groups that tend to perpetuate and extend privileged situations. Sophisticated programs of trade intervention and selective tariffs, even when based on technically solvent arguments, will probably be captured by interest groups and transformed into instruments of income redistribution in their favor. Beneficiaries and would-be beneficiaries of protectionist trade policies are likely to devote a potentially large amount of resources to “rent seeking”—activities aimed to maintain and extend existing protection, influence the allotment of import quotas, etc.—further magnifying distortions and inefficiencies in the domestic allocation of resources. In this context, an easy-to-monitor commitment to free trade may be the optimal viable policy.

Revenue Generation: A Nonprotectionist Case for Tariffs

The rationale for tariffs is sometimes unrelated to protectionist trade policies. Unlike nontariff barriers—quotas, competitive subsidization, voluntary export restraints, etc.—import or export tariffs yield tax revenue to the government. In some countries, taxes on international trade constitute the main and most stable

⁴For a comprehensive exposition, see Corden (1974) and Dixit (1985).

⁵For an overview of the links between outward-oriented trade strategies and economic growth, see International Monetary Fund (1993), Chapter VI.

⁶See Barro (1989) and Backus, Kehoe, and Kehoe (1991).

⁷For exposition and review of the political dimension of protectionist policies, see Krueger (1974) and Bhagwati (1982).

source of government revenue. The need to raise revenue may outweigh, in some cases, the negative effect that tariffs have owing to their protectionist side effects.

Trade taxes are not optimal instruments to raise revenue. It can be shown that a combination of domestic taxes levied neutrally with respect to domestic and foreign products and that yield the same revenue can cause a lower efficiency loss.⁸ When the revenue objective is taken as given, the necessary taxes should be designed to minimize losses in efficiency and growth potential. The efficiency losses generated by taxes on international trade stem from the "wedge" they introduce between international and domestic prices. The inward-oriented bias they cause can produce large inefficiencies and seriously hamper growth. Domestic taxation such as consumption or income taxes can meet the revenue target with lower rates, broader bases, and without a protectionist bias. Taxes on domestic consumption can also be collected on imports at the border. This will fulfill the revenue function of a tariff and be equally easy to administer without protecting domestic producers. Similarly, taxes on luxury items are better designed as domestic excises—collected at the border when applied to imports—than as tariffs.

The argument against tariffs as revenue-raising instruments, however, rests on the availability of trade-neutral domestic taxation. In some cases, either the necessary domestic taxes do not exist and need an implementation period or they cannot be raised beyond existing levels. An argument in favor of trade taxes is their lower administrative cost. The *World Development Report*⁹ estimates that the administrative costs of levying trade taxes are between 1 percent and 3 percent of revenue collected. The corresponding costs for VAT and income taxes are estimated at 5 percent and 10 percent, respectively. Therefore, countries which are constrained by the weakness of their tax administration, the immature stage of market institutions, and the lack of qualified personnel and accounting sophistication of taxpayers resort to tariffs as a relatively straightforward method to raise revenue. Thus, budgetary pressures combined with exceptionally limited tax handles can dictate the use of trade taxes for revenue purposes.

In the medium- and long-term, a strategy aiming at sustainable growth should encompass the use of domestic tax instruments and implementation of adminis-

tration improvements necessary to phase out any reliance on taxes on international transactions. While administrative costs of collecting trade taxes are low, the economic social cost of increasing trade taxes is generally higher than that of raising domestic taxes.¹⁰ Correspondingly, when tariffs are used with a revenue objective, the rate should be low enough to avoid any significant protectionist bias.

Balance of Payments Objectives

Tariffs or across-the-board import surcharges are often applied for balance of payments reasons by countries facing an imbalance in the external sector. An external imbalance indicates that the real exchange rate (the ratio between the domestic and foreign prices of tradable commodities) is not sustainable. It can be caused by differentials in inflation rates that are not reflected in the exchange rate, deterioration in the terms of trade, etc. By imposing a tariff, governments may try to avoid the necessary domestic adjustment.

Under a floating exchange rate regime, the tariff will prompt a revaluation offsetting the trade effect of the tariff increase. Due to that, tariffs are used to correct external imbalances under fixed exchange rate regimes or when the government tries to avoid a devaluation. The aim is to imitate the effect that a devaluation would have on the trade balance. While a devaluation would have beneficial effects on exports, however, a tariff impairs exports through increases in costs. Since resources will move away from the export sector, the measure can, in fact, worsen the trade balance in the long run.

When a country faces a balance of payments problem, the optimal response depends on the cause of the imbalance. Generally, a policy of domestic adjustment, including fiscal measures, that addresses the root of the imbalance, is necessary.

Antidumping and Countervailing Duties

Under GATT rules, antidumping and countervailing duties can be imposed by country members to protect their domestic producers from injury owing to "dumping" of goods by foreign suppliers or to offset trade-distorting subsidies set by trade partners. The legitimacy of these measures is based on the defense of competition and fair trade. Nevertheless, the imposition of duties is not always the optimal response by the

⁸A standard presentation of the argument behind the superiority of domestic taxation can be found in Dixit (1985).

⁹See World Bank (1988).

¹⁰There is abundant empirical evidence that supports the view that higher marginal social cost accompanies trade taxation. For a selection of recent references and case studies, see World Bank (1988) and Tanzi (1990).

importing country. Moreover, the general consensus among trade economists is that, in most cases, countries have used antidumping and countervailing provisions to implement protectionist policies.¹¹

From the perspective of the importing country, dumping may be harmful if it involves predatory pricing or intermittent dumping. Predatory pricing occurs when prices are set below cost by foreign exporters with the objective of driving domestic firms out of business. Once domestic competition is eliminated, prices are set at monopoly levels. In practice, this type of operation is very uncommon because the preconditions for its success are rarely met. Foreign suppliers must have a stable monopolistic position on the international market and domestic suppliers must face substantial re-entry barriers. Intermittent dumping is the disposal of occasional surpluses by exporting them at exceptionally low prices. In either case, before the introduction of antidumping duties, the potential harm to competing domestic producers needs to be weighed by the government of the importing country against the eventual benefits to consumers and importers.

In many cases, legitimate market behavior is labeled as dumping by importing countries and antidumping measures are undertaken with protectionist objectives. For example, price differentials between domestic and export markets do not necessarily imply dumping behavior. Price differentiation is a profit maximizing strategy routinely implemented by firms that operate in several markets. Many actions that would not be considered unfair practices domestically are, however, prosecuted with alacrity when pursued by foreign exporters.

Countervailing duties are introduced with the objective of offsetting export subsidies implemented in the exporting country. Subsidies to "strategic" industries have been justified by proponents of the new trade theory as means to gain competitive advantage in these industries.¹² Under GATT rules, subsidies are allowed on exports of primary products only. In practice, however, the subsidy component of the price of imported commodities is difficult to determine.

The incidence of antidumping and countervailing actions—including duties, voluntary export restraints, etc.—increased substantially in the late 1970s. Finger and Nogués¹³ report that between 1980 and 1985, the European Community and seven other countries initi-

ated 1,155 antidumping cases and 425 antisubsidy cases. Table V.1 shows a preponderance of countervailing actions in the United States while antidumping cases are evenly spread among all countries. Bhagwati¹⁴ argues that antidumping and countervailing provisions have been "captured" by protectionist special-interest groups and domestic producers.¹⁵ The design of these provisions facilitates their use for the purpose of putting obstacles to successful foreign suppliers. Often, most of the burden of proof lies with the defendant and different forms of restrictions might be triggered at the moment of filing the complaint, independently of whether it is eventually substantiated. Kelly and McGuirk¹⁶ present evidence of the widespread use of countervailing and antidumping duties in the European Community to protect cartelized domestic markets from foreign competition—for example, in 52 percent of the cases under anticartel investigation in the chemical industry, a parallel antidumping action had been initiated. Once antidumping or countervailing duties are established, they tend to become permanent.

Table V.1. Countervailing Duties and Antidumping Actions Initiated

	United States ¹	Australia	Canada	EEC
Countervailing duties				
1980	8	0	3	0
1981	10	0	0	1
1982	123	2	1	3
1983	21	7	3	2
1984	51	6	2	1
1985	39	3	3	0
Total	252	18	12	7
Antidumping actions				
1980	22	62	25	25
1981	14	50	19	47
1982	61	78	72	55
1983	47	87	36	36
1984	71	56	31	49
1985	65	60	36	42
Total	280	393	219	254

Source: Bhagwati (1988).

¹Countervailing duties and antidumping actions correspond to U.S. Trade Act, Sections 701 and 731, respectively.

The "Infant Industry" Argument

Many departures from free trade, including the import substitution policies followed by many developing

¹¹For recent analyses and descriptions of the use of antidumping and countervailing measures, see Bhagwati (1988) and Kelly et al. (1992).

¹²See, for example, Helpman and Krugman (1989).

¹³See Finger and Nogués (1987).

¹⁴See Bhagwati (1988).

¹⁵Further evidence in the same direction can also be found in Kelly and McGuirk (1992).

¹⁶See Kelly and McGuirk (1992).

countries in the 1960s and 1970s, have been justified by using different variants of this theory. The argument essentially posits that some industries have initially high costs but may, in the long run, acquire a comparative advantage after a temporary period of development. Several conditions have to be assumed for the argument to be valid:

(1) The present value of future social and private returns generated by the infant industry must be higher than that of other industries or alternative uses of resources. The cost of the infant industry should include the loss in efficiency and damage to other sectors owing to distortions caused by protection.

(2) In the absence of protection, private investment in the industry would not occur. That is, expected private returns do not justify investment in the industry. Therefore, a substantial part of the returns or decrease in costs to be generated by the industry must consist of externalities. If future benefits could be privately appropriated by the initial investors, private firms would themselves be willing to incur the initial costs and protection would be redundant. If private investors are willing to undertake the initial investment but they lack the necessary capital, other measures would be more effective than protection (e.g., liberalization of capital markets and foreign investment).

(3) Temporary protection must make initial investment in the industry cost effective for private investors. It might be the case that, even with protection, private investment does not take place. In practice, "import substitution" policies have necessitated many other government interventions besides protection—subsidies, regulation, official prices, etc. When externalities are the reason for protection, sufficient externalities must accrue to the industry itself, to become competitive eventually. If most externalities are spillovers to other industries, the infant will never be able to stand alone.

(4) The protection has to be, in fact, temporary, and must be decreased over time in an optimal manner. In particular, international competition has to be kept constantly at a sufficiently high level to encourage the cost-saving investments that will eventually render protection unnecessary. Policymakers must be able to monitor the evolution of production and market characteristics in the industry. The timetable of protection disarmament has to be well known, credibly announced, and timely implemented. If firms expect the period of protection to be extended, they will not invest in reducing costs and the industry will not be able to survive international competition. Since this is likely to force the government to extend the period of pro-

tection, the expectation will become self-fulfilling.¹⁷ It is also assumed that vested interests to maintain protection will not arise or will be effectively resisted.

Thus, the validity of the infant industry argument rests on the validity of very restrictive conditions. Even when those conditions are met, free trade combined with targeted industrial policies is usually a superior response. When the cause of the externality can be clearly identified (and it is difficult to make a consistent case for protection when it cannot), a targeted policy is generally superior to across-the-board protection of the industry. For example, if intensive research and development need to be carried out in the early stages, subsidies to this activity would be more cost-effective than wide-ranging protection.

Much of the thrust of the infant industry argument for protection dissipates when foreign direct investment is considered. In cases where the decrease in costs is brought about by initial investment in research and development or in general know-how, the industry can operate at the lowest cost from the outset by attracting foreign investment. Foreign investment and access to international capital markets—which call for nonprotectionist, outward-oriented trade policies—are also the first-best solutions when the problem stems from imperfect domestic capital markets.

Trade economists have consistently pointed out that, in practice, protection has persisted for long periods without evidence of any decrease in costs in the protected industries. On the contrary, there is abundant evidence of resilient inefficiency and high costs in protected industries that have been trimmed only by trade liberalization. Also, there is no evidence that higher rates of protection have been accorded to those industries with greater externalities.

Tariffs and the Terms of Trade

In principle, imposing a tariff may be beneficial for a country that can affect the international price of its imports or exports. If exporters do not act collusively but the country as a whole possesses some degree of monopolistic power on export markets, the imposition of an export tariff can imitate the effect of collusion among exporters. Similarly, an import tariff can implement an advantageous pricing strategy when the country has a monopsony on import markets. The optimal tariff would be obtained by setting the benefits—that is, government revenues and private profits—against the costs of the tariff—that is, domestic distortions and misallocation of resources. Although the welfare of the

¹⁷See Tornell (1991).

country could be raised in this manner, the welfare of other countries would be decreased in a larger amount. Thus, the gains to one country are clearly achieved at the expense of others.

Small trading economies, such as those of most developing countries, can hardly affect international prices by trading in manufactured or primary products. Those countries, however, that possess the monopoly of a natural resource, such as oil, can improve their terms of trade by restricting or taxing exports. That is also the case of large industrial countries whose volume of international trade accounts for a large share of the international markets. Nevertheless, tariffs motivated by the terms of trade argument are rarely seen in practice. The reason seems to be the fear to trigger a chain of mutual retaliations that would compromise the world trading system.¹⁸ It can be shown that when the possibility of retaliation is taken into account, the use of tariffs to improve the terms of trade may no longer be optimal.¹⁹ Multilateral trade institutions and the inter-World War experience of trade retaliations seem to have sufficed to enforce restraint in the use of this sort of "beggar-my-neighbor" policy.

Strategic Trade and the New International Economics

In recent years, some trade economists have proposed new approaches to the analysis of the gains and costs of free trade.²⁰ In the center of the new theory is the consideration of economies of scale and externalities in some industries. Economies of scale and externalities cause decreasing average costs and thus, larger producers have an advantage over smaller ones. According to this theory, those suppliers that gain initial control of a greater portion of the market will be able to drive competitors out of it and to secure for themselves an oligopolistic position. The "new trade theory" posits that if an industry exhibits these characteristics, a country may be able to gain an oligopolistic or monopolistic power on the international market for the product under consideration. Once a country has achieved that position, it will obtain monopoly profits at the expense of its trade partners. Moreover, if its trade partners pursue free trade policies, the main producer can effectively preclude competition due to its

lower costs. By implementing specific industrial policies, such as subsidies and protection, a country can allow selected domestic industries to contest monopolistic positions in international markets and replace existing monopolists.

Free traders have argued that the existence of imperfectly competitive domestic markets greatly strengthens the case for free trade. The larger the market, the less scope there is for monopolistic market power, and free trade greatly increases the size of the market. In fact, free or freer trade has proved to be the best anti-monopoly weapon. Moreover, there is no evidence that international markets are generally oligopolistic. Even in cases where supply is concentrated in a few producers, the threat of new entrants can preclude monopolistic behavior. This threat is particularly present in international markets under free trade.

Krugman²¹ argues that to design strategic trade policies, governments must have extensive knowledge of many details that are possibly beyond their reach. In addition, the general equilibrium effects of strategic trade policies are uncertain. Since promotion of a particular sector implies drawing away resources from other sectors, the pursuance of strategic trade policies in key industries is likely to generate significant intersectoral and intertemporal distortions. Empirical analyses based on general equilibrium models indicate substantial efficiency losses which generally exceed the gains from strategic trade policies.²² Furthermore, adherence to a policy of industry subsidization and protectionism creates powerful incentives for rent-seeking behavior and interest group pressures. Under a policy of discretionary protection, in practice, governments are unlikely to resist lobbying and special-interest politics. Many economists that would, in principle, justify protectionism in some selected cases, consider that an adequate implementation of selective protection is politically infeasible. Consequently, the establishment of a blanket policy of free trade may be the best feasible policy.²³

Measuring the Bias of a Trade Regime: Nominal and Effective Protection

The imposition of a tariff on an imported good raises the domestic price of the good. If there are domestic producers of the same good, the tariff shelters them from international competition. This effect is often the main objective of the tariff. Even if it is not the

¹⁸Arguments in this direction can be found in Baldwin (1990 and 1992).

¹⁹See McMillan (1986).

²⁰Some of the most influential presentations of the theory of strategic trade and the new international economics are Grossman and Richardson (1985), Krugman (1986, 1987a, and 1987b), and Helpman and Krugman (1985). Critical appraisals can be found in Harberger (1990) and Baldwin (1992), among others.

²¹See Krugman (1987b).

²²See Baldwin (1992).

²³See Harberger (1990).

primary objective of the tariff—see below—protection of domestic industries will be, to some extent, an inevitable side effect. Protectionist policies accord different degrees of protection to different industries. Thus, import-substituting industries are generally favored by protection while exporters and producers of nontradables may be impaired. Therefore, a trade regime biases the incentives driving the domestic allocation of resources. When assessing the bias of a trade regime, it is often necessary to quantify the amount of protection that it affords to different industries.

Throughout this section, the discussion will be conducted in terms of nonprohibitive tariffs. A tariff is nonprohibitive if the domestic price, exclusive of other domestic indirect taxes, is approximately equal to the international price plus the tariff.²⁴ This is the most common case encountered in practice. Nevertheless, before entering the analysis of nonprohibitive tariffs, it is worth mentioning the following two extreme cases or “corner solutions.” (1) When the international price plus the tariff is substantially higher than the domestic price, the protection afforded by the tariff is equivalent to a ban on imports. (2) The opposite extreme case occurs when the international price plus the tariff is significantly below the price at which domestic producers would be able to supply the good.²⁵ In the latter case, there is no domestic production, and the tariff does not result in protection of any domestic industry—it is, in fact, equivalent to a free trade regime with a domestic excise of the same magnitude as the tariff.²⁶

Having considered the extreme cases, the rest of this section deals with the case in which domestic prices of tradable goods are equal to their international prices plus the corresponding tariffs. The amount of protection is usually expressed as a percentage of the international price. A first straightforward approach is to compute *the nominal rate of protection*. If the tariff is an ad valorem tax proportional to the value of imports,

²⁴Domestic price means the price prevailing in the domestic market. Notice that this price might be, in some cases, below the level given by the international price plus the tariff (prohibitive tariffs). This will be the case if perfect or monopolistic competition prevails in domestic markets and the tariff is set at a level such that the international price plus the tariff is above domestic average costs. It could also occur under monopolistic or oligopolistic conditions if the price that results from these conditions is below the international price plus the tariff.

²⁵For example, a country might impose a tariff on cars even if there is no domestic production. In that case, an excise would yield the same revenue and would not afford protection to future or prospective domestic producers.

²⁶If there is imperfect competition, for example, when a country has monopsonistic power on the market for some imported commodity, the imposition of a tariff may lower its international price. In extreme cases, the domestic price could even decrease after the imposition of a tariff (the Metzler paradox). The analysis developed in this section abstracts from such effects.

the tariff rate itself measures the nominal rate of protection. If the tariff is specific, the nominal rate of protection is given by the tariff divided by the price net of the tariff. Thus, the algebraic expression for the nominal rate of protection is

$$NRP = \frac{P_D - P_I}{P_I},$$

where P_I and P_D denote the international and domestic prices, respectively, of the imported good.

The nominal rate of protection does not always give a good indicator of the amount of protection provided to an industry by the tariff system. Protection does not only increase the price at which domestic industries can sell their output. If a tariff applies to intermediate goods, it will also increase the price that domestic producers have to pay for their inputs. On the other hand, if a tariff applies only to the finished product but not to any of its inputs, the amount of effective protection will depend on the magnitude of the value added. When a domestic industry can charge a margin between unitary costs and the price of its output (value added at domestic prices) which is larger than international standards for that margin (value added at international prices), the industry receives positive effective protection. Conceptually, effective protection is the relation between domestic margins of value added and the standards for those margins prevailing in the international markets. A simple example illustrates this point further.

Suppose that a television set sells on the international market for US\$800 and the parts of which it is made sell for US\$500. To encourage domestic production, a country places a 25 percent tariff on imported household appliances. This allows domestic assemblers to charge US\$1,000 instead of US\$800. Before the imposition of the tariff, domestic assembly would take place only if it could be done for US\$300, which is the difference between the international price of the final good (US\$800) and the cost of its components (US\$500). After the imposition of the tariff, domestic production will take place even if it costs as much as US\$500, which is the difference between tariff-inclusive price (US\$1,000) and the cost of its components. That is, the 25 percent tariff rate provides an effective rate of protection of 66 percent. This is the amount by which domestic costs can exceed international costs (US\$500 minus US\$300) in the assembly industry as a proportion of international costs (US\$300).

Now suppose that the country adds a second tariff of 20 percent on imports of television components, raising the cost of components to domestic assemblers

from US\$500 to US\$600. The new tariff makes domestic assembly of television sets less advantageous. Domestic assembly will be undertaken only if its cost does not exceed US\$400 (US\$1,000 minus US\$600). The new tariff, although it extends protection to domestic producers of components, results in an effective rate of protection to assembly of 33 percent (US\$400 minus US\$300 as a proportion of US\$300).

Summarizing, *the effective rate of protection* for a sector can be defined as the amount by which the value added in the sector at domestic prices exceeds the value added in the sector at international prices expressed as a percentage of the latter. That is,

$$ERP = \frac{V_D - V_I}{V_I},$$

where V_I and V_D denote the value added at international and domestic prices, respectively.

A trade regime may provide different levels of protection to different industries. The rate of protection for a group of industries can be obtained as a weighted average²⁷ of their individual rates of protection. A trade regime is neutral when the aggregate effect of all trade and industrial policies is to offer the same nominal or effective protection to the production of all tradables. In contrast, a trade regime is biased when exportables and importables are accorded a dissimilar degree of nominal or effective protection. A commonly used index of this bias is the ratio of the rates of protection of importables and exportables.

The use of the concepts of effective or nominal rates of protection presents some problems. First, it only takes into account the direct impact of a tariff. If the trade regime were to be changed, indirect general equilibrium effects would take place economy-wide. Empirical studies tend to indicate that nominal and effective rates of protection underestimate the actual degree of protection.²⁸

Second, it is generally true that nominal or effective rates of protection vary widely across industries. Yet, they may have an average value of zero which, on face, implies no protection. The variation, however, in nominal or effective rates of protection across industries is itself an important distortion. Full neutrality of a trade regime requires uniform zero rates of protection across the tradable goods industries.

²⁷Value added in an industry or total value of production can be used to compute the weights.

²⁸For a survey on empirical studies and measures of protection, see Krueger (1984).

Neutrality of a trade regime, as defined previously, only implies equal rates of protection across industries of tradable goods. Specifically, neutrality implies that the rates of protection accorded to exportables and importables are the same, that is, the trade regime does not discriminate between imports and exports. Neutrality does not imply that these rates of protection are low or that the trade regime is nondistortionary. In particular, a trade regime with high tariffs may still be neutral. If tariffs are coupled with export subsidies, the rate of protection of importables can be equal to that of exportables while the country maintains high rates of protection. Moreover, the relative price of tradables and nontradables will be highly distorted. Therefore, the measure of the bias of a trade regime cannot be taken to represent the extent of the efficiency loss due to protectionist policies.

Optimal Import Tariffs and Tariff Structure

In recent years, policy advice on trade reform, notably in the context of IMF and World Bank adjustment programs, has emphasized the need to lower average tariffs and to curtail the dispersion of existing rates.²⁹ Often, these recommendations were part of reform programs aiming at a low, uniform tariff and at the complete removal of nontariff barriers. The rationale behind these recommendations does not concentrate on a single argument nor is the rationale purely theoretical. A wide scope of considerations, ranging from administration costs to suboptimality of protectionism, points in the direction of a low and uniform tariff. Nevertheless, particular circumstances may justify deviations from this policy or require a transition period between the existing trade regime and the optimal. This section summarizes some of the practical and theoretical considerations in the design of optimal tariff structures.³⁰

Optimal Tariff Structure Under a Revenue Objective

In most cases, the imposition of tariffs is not an optimal policy.³¹ That is, trade-neutral domestic taxes and subsidies in the case of externalities can raise the same

²⁹See Thomas and Nash (1991).

³⁰For an extensive coverage of the issue of optimal tariffs in the context of adjustment policies, see Subramanian, Ibrahim, and Torres-Castro (1993).

³¹The superiority of domestic taxation over international trade taxes is examined in the other sections. (See the arguments for and against tariffs in the section on trade and protectionism.) An exposition of the suboptimality of tariffs vis-à-vis domestic taxation can be found in Dixit (1985).

revenue as a given tariff system with lower distortions and efficiency losses.

In practice, tariffs are often introduced by governments seeking to protect domestic producers from foreign competition. Protection of this sort distorts the relation between domestic and international prices prompting an inefficient allocation of resources. As higher prices spread across domestic markets, they impair the exporting capacity of the country through higher costs, lower factor productivity, and currency overvaluation. In the absence of foreign competition, domestic producers often lack the incentive to introduce growth-enhancing new technologies and cost-saving measures. Protection encourages instead unproductive rent-seeking activities such as lobbying and special-interest politics. These activities are undertaken by potential beneficiaries to maintain and extend existing levels of protection. From the revenue point of view, trade-neutral domestic taxation provides a broader base and the possibility of lower tax rates while avoiding inward-oriented biases. According to these considerations, the optimal tariff would be an across-the-board zero rate tariff.

Nevertheless, owing to revenue considerations, a low tariff has been frequently advised. When designing the optimal tax mix to meet given revenue objectives, the distortions introduced by a tariff should be weighed against savings in collection costs and reduction of distortions elsewhere in the economy. Collection costs of international trade taxes are generally lower than those of domestic taxes. The *World Development Report*³² estimates that the average collection costs of trade taxes are between 1 percent and 3 percent of revenue. In contrast, the same source estimates that the cost of domestic taxation can be as high as 10 percent of revenue collected in the case of income taxes and 5 percent of revenue in the case of the VAT.

The case for a low tariff rests on its small economic cost. The economic cost of levying a tax is a more comprehensive concept than the administration cost. The economic cost is the value of the output forgone due to losses in economic efficiency. The economic cost of a tax rises more than proportionally with the tax rate.³³ This is particularly true in the case of taxes

on international trade.³⁴ These taxes add protection-related efficiency losses to the losses that could be expected from any indirect tax with a relatively narrow base. Efficiency losses related to protection are caused by the inward-oriented bias that tariffs introduce. The discrimination against imported products distorts domestic prices, increases domestic costs, and impairs exporting activities. At low rates, the lower administrative cost of a tariff might prevail over the economic cost of protection. The case for a low-rate tariff is reinforced if existing domestic taxes are costly to administer and highly distortionary, and if fiscal imbalances dictate an urgent increase in government revenue.

Finally, when a country has a complicated tax structure that is difficult to dismantle in the short term, it may become infeasible to increase domestic taxation further. In such cases, the revenue objective and the level of domestic taxation may have to be taken as given.

Once it has been decided to implement a tariff with low rates, there are several reasons to minimize the dispersion of rates.

- Multiple rates substantially increase the cost of administering the tariff. Since low collection costs are an important reason for using tariffs, multiple rates undermine that rationale by increasing collection costs.

- A uniform rate implies uniform effective protection of all domestic industries.³⁵ Provided that exporters are reimbursed the tariff paid on their imported inputs, a uniform rate structure minimizes discrimination between sectors. When inputs are taxed at a lower rate than outputs, industries producing final goods are granted a higher effective protection than other economic activities. In general, a high tariff rate on a product benefits domestic producers of that good and harms those activities that use the product as input. Rate dispersion will produce different levels of effective protection across industries according to the rates that apply to their output and inputs. Exporters occupy a special position in the economy. While the price of their output is generally set by international markets, the price of their inputs—that is, their costs—are increased by protection. Consequently, protectionist pol-

³²See World Bank (1988).

³³Formal derivations of this result can be found in Auerbach (1985) and in Atkinson and Stiglitz (1980). The rationale behind it is that when the tariff rate is low, the first resources that are shifted to less efficient uses are those that exhibit similar productivity in their new and old functions. Therefore, the misallocation of resources has a comparatively low cost. In contrast, when the tariff rate is high, it can cause reallocation of resources to uses where their productivity is much lower than in their optimal employment.

³⁴World Bank (1988) contains estimates of the economic cost of tariffs for several countries.

³⁵A uniform rate tariff accords equal effective protection to all import-substituting industries. Exports, however, are penalized and have a negative effective protection rate in the absence of duty drawbacks. Similarly, producers of nontradables will experience a decrease of the relative price of their output. Therefore, resources will be shifted from export-oriented and other industries to import-substituting industries. This anti-export bias is an instance of the efficiency losses introduced by a tariff.

ities tend to impair export industries. To minimize this antiexport bias and allow exporters to compete in international markets, it is generally necessary to reimburse the import duties paid on inputs used to produce exports.

- Rate dispersion encourages special-interest groups to devote resources to increase the amount of protection granted to them. Every industry has a strong incentive to press for an increase of the particular rate that applies to their output. In contrast, a clear commitment to uniformity diminishes the incentive to engage in lobbying activities. First, since any increase in the tariff rate gained by a group has to be extended to all imports, the tariff rate increase that any special-interest group is likely to obtain is small. Second, all import-substituting sectors benefit from an increase, irrespective of who devoted resources to lobby for the increase. Therefore, there is an incentive to wait and let other groups bear the cost of lobbying. That is, free riding can be expected to diminish protectionist pressures.³⁶

- The distortions prompted by a tariff grow more than proportionally with the rate. In contrast, revenue grows, at most, proportionally. In fact, revenue should be expected to increase less than proportionally to the increase in rates. This is due to the decrease in demand prompted by higher prices and, perhaps, due to tax evasion and smuggling encouraged by higher tariff rates.

Therefore, to obtain a given level of revenue with the lowest distortionary effect, the tariff should be applied across the board to all imports with a minimum dispersion of rates.

There are also arguments in favor of rate dispersion. The main nonprotectionist argument for differentiated tariff rates is based on the theory of optimal taxation. Optimal taxation is also known as Ramsey taxation after the economist F.P. Ramsey, who in 1927³⁷ derived the characteristics that an optimal tax system should have to minimize tax-induced distortions.³⁸ According to the theory of optimal taxation, those commodities for which demand has a lower price elasticity should be taxed at higher rates. The reason behind this prescription is that if the demand for a commodity is

inelastic, it will change relatively little after the imposition of a tax. That is, consumers will absorb the tax burden without substantially changing their economic behavior. Hence, to minimize distortions, taxation should concentrate on those commodities.

Another result of optimal commodity taxation is that final goods should be taxed at higher rates than inputs to production. The reason is that tax-induced changes in the relative price of inputs can lead to the choice of inefficient technologies. Some inefficient technologies may become more profitable to the extent of overtaking efficient technologies. Since the tax will be eventually borne by the final consumer, it is better to tax final consumption directly, thereby avoiding production distortions.

Extending that argument, the theory of optimal taxation recommends higher tariff rates on final consumption goods than on intermediate products. Among final consumption goods, those with a more inelastic demand should have higher tariff rates.

The theory of optimal taxation has found very little application in practice. The amount of information required to design the optimal tariff structure is beyond the possibilities of even the most sophisticated government agency. It requires precise knowledge of demand elasticities for all goods and services. Moreover, in a dynamic economy, the characteristics on which an optimal tax structure should be based—price and cross elasticities of demand, preferences, available products, etc.—are constantly changing. The administrative cost of implementing such a system would probably exceed the revenue collected.³⁹

Tariff rates differ widely across commodities in many countries. Nevertheless, the reasons for such rate spread owe little to the theory of optimal taxation. Special-interest groups and lobbying by import-substituting industries often press governments for higher tariff rates on their products and lower tariff rates on their inputs. Most governments implement tariffs to protect domestic industries and, from a protectionist point of view, the optimal tariff structure does not need to exhibit a uniform rate.

³⁶For a defense of a uniform tariff rate on political economy grounds, as well as a discussion of advantages and shortcomings of rate differentiation, see Harberger (1990).

³⁷See Ramsey (1927).

³⁸For a contemporary treatment of the theory of optimal taxation, see Atkinson and Stiglitz (1980) and Auerbach (1985). Applications of the theory of optimal taxation to the topic of optimal tariff structures can be found in Dasgupta and Stiglitz (1974), and Corden (1974).

³⁹Considerations stemming from the theory of optimal taxation, however, could provide arguments in favor of tariffs on “demerit” goods—such as alcoholic beverages, tobacco products, etc. Although in these cases, a domestic excise is superior to a tariff, the latter may be the only feasible option owing to constraints on available tax handles. Thus, the rationale for excises may extend to tariffs on selected items under some circumstances.

Optimal Tariff Structure Under a Protection Objective

In many cases, policymaking needs to operate within the parameters of a given level of protection. The optimal tariff structure under that constraint will depend on the reasons for protection. For instance, if the objective is to reallocate resources toward a particular sector—such as agriculture—and away from other domestic industries, a uniform tariff may be unable to accomplish that goal. Nevertheless, the case for a tariff structure with a single rate or with very few rates within a narrow band, might still be argued on administrative, political, or efficiency grounds.

A common argument in favor of protection is based on the *infant industry theory*.⁴⁰ According to this argument, protection is needed to allow some domestic industries to develop. This theory posits that certain industries are initially uneconomic but may become competitive in the long run. These industries, once they are established, generate externalities and experience a decrease in costs that will, eventually, allow them to compete in the world markets. Recently, *strategic trade theories* have defended protection for selected industries on the grounds that these industries exhibit increasing returns to scale. Therefore, established producers can effectively prevent competition because their costs are lower than those of foreign potential entrants. The markets for their products will necessarily be dominated by a few firms from one country. Protection can allow domestic suppliers to challenge incumbent oligopolists and, eventually, take their place.

If protection is motivated either by the infant industry argument or by strategic trade considerations, the optimal tariff structure would not normally be uniform. Protection should be accorded only to those industries that need it to generate externalities or to contest international markets. When protection must be extended to several industries, the rate of protection accorded to each of them should be a function of its particular protection needs. Overprotection of an industry may eliminate the incentives to invest in cost-saving activities, defeating the very purpose of the tariff.

In the case of a country that possesses monopsonistic power on certain international markets, protection can improve its terms of trade. Since the country can lower the price of some of its imports by restricting demand, a tariff on those imports may improve welfare in the country at the expense of other countries. The optimal tariff structure would restrict protection to those

products whose international price the country can affect. The tariff rate on each commodity should be commensurate to the market power of the country.⁴¹ Nevertheless, arguments for protection based on terms of trade are seldom employed in practice. Fear of retaliation seems to be sufficient to dissuade governments from implementing this type of policy.⁴² Observed behavior suggests that when the possibility of retaliation by trading partners is taken into account, a policy of zero tariffs could be optimal.

To conclude, even when tariffs are implemented for protection, uniformity or quasi-uniformity of tariffs may still be defended on a variety of grounds. First, the advantages of a diversified rate structure may not compensate the cost of administering such a system. Second, political economy arguments point to the need for across-the-board rules to curtail unproductive rent-seeking activities. Finally, the practical difficulties involved in identifying the relevant industries or the appropriate rates of protection may preclude the implementation of optimally differentiated rates.

Tariffs on Inputs and Duty Drawbacks

In recent years, many developing countries have undertaken trade reforms to promote economic efficiency and growth. The 1970s and 1980s have witnessed a reversal of import substitution strategies and the adoption of outward-oriented trade regimes.⁴³ Tariff structures have undergone drastic changes as part of trade reforms. The main directions of these changes have been the reduction in average protection rates and the convergence in tariff rates across different imports.

Since outward-oriented trade reforms involve substantive reductions in average tariff rates, they can be almost always expected to result in revenue losses. When domestic tax instruments and institutions are well developed, the revenue loss can be offset by raising trade-neutral domestic taxes. In most cases, however, trade reform involves raising tariffs on the least protected goods to recover part of the revenue lost by the reduction of the highest rates.

Regardless of revenue considerations, reducing the dispersion of tariff rates has been an objective of trade reforms for its own sake. Constraining tariff rates to a narrow band affords similar effective protection to all import-substituting industries, thereby reducing distortions and biases. It also reduces the costs of collection

⁴¹That is, the size of the tariff would be inversely related to the elasticity of supply faced by the country.

⁴²See Bhagwati (1988).

⁴³See International Monetary Fund (1993), Chapters IV and VI.

⁴⁰See this chapter's section on free trade and protectionism.

and tends to curtail incentives for tax evasion and smuggling. Finally, a commitment to a uniform or quasi-uniform tariff structure hinders attempts from special-interest groups to attain privileged treatment.

As a result of trade reform, tariff rates on intermediate inputs can be expected to converge to the average rate, thereby increasing operating costs of selected producers across the economy who had faced lower tariff rates on inputs prior to reform. While this increase in cost will tend to level the field among industries that produce for the domestic market, it could impair export industries. Different industries that faced distorted cost structures according to which inputs they use—domestically produced, highly protected, freely imported, etc.—will face, after the reform, a uniform price differential relative to world prices independently of the composition of their inputs. They will also face an equal level of protection on their inputs than on their output. To the extent that exporters cannot affect the price of exports, however, an increase in tariff rates on inputs will damage their competitiveness. Unlike industries producing for the domestic market, export industries will not experience an increase in the price of their output owing to protection.

Despite the success of outward-oriented trade strategies, many developing countries still maintain high levels of protection. Inward-oriented trade regimes are characterized by a wide dispersion of tariff rates and high average rates. Very often, the objective of import-substituting policies has been to protect domestic producers of final consumption goods such as consumer durables, textiles, etc. To achieve high effective protection for those industries, imports of competing products were either disallowed or taxed at a very high rate.

Although inputs were occasionally taxed at lower rates, protectionist policies have proved to result in a substantial antiexport bias. Most developing countries are unable to change their terms of trade because of the smallness of their share in international markets. That is, exporters cannot shift forward the increase in cost via increases in prices. Therefore, the high cost and limited availability of inputs results in a negative effective protection rate for those industries that employ importables to produce exportables.⁴⁴ The antiex-

port bias of protectionist policies stems from two concurrent effects caused by tariffs. First, exporters face increased costs of domestic and imported commodities. High costs are not constrained to the increase in the cost of importable inputs owing to the direct effect of tariffs. Increased costs are likely to spread across the economy affecting nonimportables and factors of production such as labor. Second, protection of import-substituting industries attracts resources to those industries at the expense of export activities.

Many of the world's manufactured exports come from places where exporters face relatively low trade barriers with regard to the taxation and availability of inputs. A key element of export success in developing countries is an efficient system for providing exporters with easy access to inputs at international prices. To ensure this, inputs required by export industries—whether directly or indirectly—must be freed from quotas, licensing requirements, delays, and other non-tariff barriers, as well as be exempt from tariffs. This removal of tariff and nontariff barriers must take place even if domestic substitutes for inputs are available. Exports should also be sheltered from the effects of indirect domestic taxation—zero-rating exports in the case of a VAT—so that they can compete in international markets unburdened by domestically generated cost-raising barriers.

One way in which some successful exporting countries have provided exporters with inputs at world prices has been by applying a policy of zero tariffs on all inputs across the board. Hong Kong and Singapore with their virtually free ports are an example of that policy.⁴⁵ The advantages of a uniform tariff structure will be lost, however, if duty-free status is granted to all inputs of production while substantial protection of final products is maintained.

In cases where significant protection rates prevail for both inputs and final products, exporters should be insulated, to the extent possible, from protection-related cost increases. To this effect, three schemes have been proposed.⁴⁶

Exemption of Imported Inputs

Exporters can be provided with duty waivers and exemptions from nontariff barriers. To facilitate administration, the coverage of these exemptions may be ex-

⁴⁴Notice that the price of domestically produced importable inputs will also increase as a result of the protection accorded against competing imported inputs. Similarly, exportables sold in the domestic market will not be able to command a price higher than their international price if they are actually exported in any amount. As soon as the domestic price of exportables deviates upward from their international price, production destined to export markets will be redirected to the domestic market depressing their price. This process will continue until the domestic price is driven down to the level of the international price or until the goods are no longer exported.

⁴⁵More recently, and in the context of transitional economies, Estonia has also applied a policy of virtual free trade. As a result of this policy, *inter alia*, the reorientation of trade toward Western Europe has been extremely successful.

⁴⁶For an exposition and assessment of a variety of export-promoting strategies, see Thomas and Nash (1991).

tended in some cases to inputs employed in the production for domestic markets. Variants of this method have been implemented in Taiwan (rebate based on accounts), Mexico and Morocco (temporary admission), and Indonesia, Thailand, and Korea (duty exemptions). Under these methods, exporters are registered and must submit an export report or plan including a list of necessary inputs to obtain a license. Usually, if the proportion of exports to total production is higher than a given threshold, an exemption of 100 percent of imported inputs is granted.

Efficient implementation of these schemes presents several obstacles. First, it is administratively difficult to extend exemptions to imported inputs employed indirectly. In the absence of a similar exemption for domestic producers of intermediate goods used by exporters, domestic inputs may not be able to compete with direct imports. Second, it is equally difficult to ascertain whether a producer is above or below the threshold on exports that warrants a full exemption of tariffs on inputs. Also, when exporters obtain exemptions only to the extent that inputs are effectively used in the production of exports, it may be necessary to monitor the technical requirements of different production activities. If the use of exempt inputs cannot be reasonably monitored, tax revenue will be eroded and domestic inputs will be displaced by duty-free imports. A possible solution to this problem, implemented in Korea and Taiwan, is to determine and publish regularly a matrix of technical coefficients for the main export commodities that is, then, applied in all cases. Similar methods have been implemented in Bangladesh, India, and Pakistan with assistance from the World Bank. Morocco applies a system of exemptions based on declarations by exporters that are verified by customs officials within six months. It should be noted that when duty-free imports can be deviated into the domestic market where they are sold at (higher) domestic prices, the opportunity cost of inputs to exporters is given by the domestic price. Therefore, even small spillovers of duty-free imports into the domestic market can neutralize the attempt to develop a competitive export sector.

Duty Drawbacks

Under this method, duties and other indirect taxes actually paid on inputs are rebated to exporters. Duty drawbacks have been used in order to meet the needs of small or occasional exporters. The system has also been used when imported inputs represent a small proportion of total inputs in the exporting sector. Duty drawbacks, unlike most direct export subsidies, are allowed by GATT rules. An important industry in which

duty drawbacks have been used to isolate exporters in both developing and industrial countries is the auto industry (Brazil, Mexico, the United States, and others). Different versions of this method have also been implemented in Korea, India, Indonesia, Taiwan, and Thailand.⁴⁷ Owing to administrative considerations, a scheme of drawbacks should include a standard rebate for each regular export product and the possibility of filing a claim, supported by evidence, when a higher rebate is sought.

Bonded Factories and Duty-Free Export-Processing Zones

The system of bonded factories involves bringing in the inputs and shipping the exports under customs seal. Under this system, the physical location of the factory is not geographically constrained. Mexico and Mauritius, among other countries, have employed the in-bond manufacturing system.

As an alternative to in-bond manufacturing, many developing countries have established duty-free export-processing zones. The reasons for the implementation of this system have been diverse. Regional development objectives, pressures from domestic special-interest groups, the intent to bypass necessary liberalization of the trade regime, the assessment that the administrative demands of bonded factories were beyond existing capabilities, or the desire to emulate the success of East-Asian export processing zones have been behind the wide popularity of this system. Thomas and Nash report that at least 30 developing countries have introduced different forms of duty-free areas to promote export activities.⁴⁸ In practice, the results have been mixed and many of these initiatives have performed very poorly as a result of unfavorable location, high starting costs, lack of necessary institutions and infrastructure, and shortcomings in their administration. The approach has been most successful where export-processing zones were part of a general environment favorable to exports and foreign investment.

The theoretical analysis of duty drawbacks, tariff exemption of export inputs, and other methods of isolating exporters from inward biases created by protectionist policies is still scarce. It is generally accepted that a first-best approach would require the removal of protectionist policies, eliminating thereby the need to insulate exporters from the damaging effects of protectionism. When some level of protection is taken as given, duty drawbacks may improve the competi-

⁴⁷See Thomas and Nash (1991), and Wade (1991).

⁴⁸See Thomas and Nash (1991).

tiveness of export industries at the expense of introducing new distortions. That is, duty drawbacks are a second-best policy. The main distortion introduced by duty drawbacks is a bias in favor of imported inputs. Domestically produced inputs will generally have a domestic price above their international price owing to the protection accorded to import-substituting firms. When an exporter purchases those domestic inputs, he cannot obtain a refund of the amount by which their domestic price exceeds the international price. In contrast, if the same exporter imports his inputs—which might be identical to those domestically produced—he will receive a duty drawback. Therefore, when inputs are imported—rather than bought from domestic producers—the price effectively paid by exporters is the international price instead of the higher domestic price.

A particular instance of this distortion occurs when different export industries use different amounts of nonimportables, such as labor. Those export industries that are more intensive in the use of nonimportables will be disadvantaged with respect to those that are more import intensive. This bias will operate independently of the comparative advantage of the country, which might very well lie in the intensive use of nonimportables as inputs.

Panagariya analyzes the effects of input tariffs on welfare with and without duty drawbacks.⁴⁹ He finds that when protection is extended to inputs, the implementation of duty drawbacks is welfare-improving up to a point. The reason is that export drawbacks allow a partial correction of the anti-export distortions introduced by protection. This effect generates a structure of exports more in accordance with the underlying comparative advantage of the country. Nevertheless, some exporters may switch from domestic to imported inputs to escape higher domestic prices, as previously discussed. In some cases, this will occur even when the adopted technology is less efficient (at world prices). When tariff rates are high, the latter inefficiency offsets the beneficial effect of the drawbacks. J. Behrman and S. Levy also analyze some conditions under which export drawbacks may be welfare-reducing.⁵⁰ If the country exports several goods and they are produced with different combinations of domestic and imported inputs, those exports that are import-intensive will be favored by tariff rebates. In this sense, export drawbacks are similar to a system of arbitrary export subsidies since they are not based on considerations of comparative advantage. Instead, the draw-

back system favors those exports with a larger proportion of imported inputs.

Export Duties and Windfall Gains

Export duties play an important role in the tax structure of some developing countries. Most export duties are levied on primary commodities by countries where exports are concentrated in a few products and represent an important part of their GDP. Around 1980, export duties existed in 67 countries.⁵¹ While since then, more countries have abolished export duties, many countries remain that continue to use selective export duties for revenue purposes. Sanchez-Ugarte and Modi present a sample of 29 selected developing countries where export taxes were specially significant around 1980. In the sample countries, export tax revenue ranged from 5 percent to 32 percent of total tax revenue and from 1 percent to 7 percent of GDP. During the 1980s and early 1990s, Cameroon, Costa Rica, Côte d'Ivoire, El Salvador, The Gambia, Grenada, Guatemala, Haiti, Jamaica, Malaysia, Peru, Sri Lanka, Togo, and Western Samoa either abolished or significantly reduced export taxes. Nevertheless, they are still a substantial source of revenue in Burundi, Central African Republic, Colombia, Ethiopia, Ghana, Honduras, Mauritius, Rwanda, Sierra Leone, Solomon Islands, Swaziland, Vanuatu, and Zaire.⁵² In most cases, export duties are levied on one or two commodities that account for a large share of the exports of the country. Coffee is the most commonly taxed product. Other taxed products comprise bananas, cocoa, copra, coconut products, timber, and sugar. A second category of taxed products are the outputs of the mining and petroleum industries, including diamonds, and petroleum.

Export duties have been defended on a variety of grounds: (1) to reduce supply and improve the terms of trade; (2) to substitute for income taxation; and (3) to stabilize export revenue and tax away windfall gains. As a source of government revenue, export taxation is inferior to domestic tax instruments such as taxation of profits. Although in theory and under certain conditions, taxation of exports might reduce supply and improve the terms of trade of a country, empirical studies⁵³ show that, in most countries, exports have been overtaxed, leading to excessive reduction in supply and to a loss of foreign currency earnings. Also, the

⁴⁹See Sanchez-Ugarte and Modi (1987).

⁵⁰Some of these countries have announced their intention to repeal or phase out export taxes in the future.

⁵¹Sanchez-Ugarte and Modi (1987) and Gómez-Sabaini (1990) contain case studies and an empirical assessment of whether the role played by export taxes has been in agreement with their declared goals.

⁴⁸See Panagariya (1992).

⁴⁹See Behrman and Levy (1990).

evidence strongly suggests that export taxes have failed to stabilize producers' incomes in most cases.

Generally, the removal of export duties has been part of tariff reform programs aiming to establish outward-oriented trade regimes. When export taxes are levied to raise revenue from the profits of exporting companies, the goal can be better served by means of domestic taxes on company profits. Often, the objective of export duties is to indirectly tax small farmers, whose income is difficult to bring into the tax net through conventional income taxation. Even then, a similar result may be obtained by taxing commercial intermediaries through excise or profit taxes. Furthermore, the implementation of a land tax and methods of presumptive taxation could curtail possibilities of tax evasion in rural areas. Moving toward trade-neutral taxes eliminates the bias against export-oriented activities and reduces efficiency losses in domestic markets. Export duties, however, are often part of an environment characterized by weak tax administration and a lack of domestic tax handles.

Implementation of Export Taxes

Explicit export taxes

Export taxes are not necessarily payable on all exports, and their rates vary across commodities. Even though the statutory rates can be ad valorem, specific, or composite, the latter (also called sliding scale) is the most common. The composite tax rate can take the form of a basic tax set on the basis of a reference price and a progressively rising rate on successive price increments. In that manner, the effective rate is an increasing function of the price prevailing in export markets. For example, Costa Rica implemented for some time a system of increasing ad valorem rates applied to that part of the price exceeding a tax-free minimum. The minimum was calculated to cover average costs and normal profits. Some countries, like Ethiopia, tie the rate to the volume of exports. Specific rates are the least common form of duties.

Progressive rate schedules have been justified as a way to tax away excess profits caused by price volatility. Another declared objective is to equalize profits across different agricultural activities to reduce the dependence on a single crop and diversify exports. Changes in prices, however, are not always paralleled by movements in profits, which should be the relevant base of taxation. Moreover, there is, in general, little rationale for progressive taxation of company profits. Extraordinary profits in some years may be necessary to offset lower profits or losses in other years to obtain a normal average profitability. They might also be neces-

sary to induce investment in risky activities—such as those characterized by high price volatility. In any case, there is no reason to single out export industries and to subject their profits to a different tax treatment from those of other sectors. Domestic and foreign competition are, on the other hand, the only effective way of eliminating excess profits and prompting diversification into other products that might offer profitable opportunities.

State marketing boards and stabilization funds

State marketing boards are public institutions that intermediate between local producers and world markets. Generally, they are granted by law a monopolistic position as commercial intermediaries for the relevant commodities. That is, state marketing boards set the price at which they buy the designated crops from local producers for subsequent sale in the international markets. Stabilization funds, on the other hand, do not usually undertake direct purchasing and export activities. Rather, they set domestic prices for local producers and commercial margins for intermediaries, but leave to private firms the actual operation of export activities.

Generating revenue has seldom been the objective of state marketing boards and stabilization funds. Instead, they have been established with a variety of other purposes:

- *Stabilization of domestic prices and incomes.* To this end, marketing boards and stabilization funds set local producer prices at a level meant to remain stable, independently of oscillations in world prices. Since this domestic purchasing price is set as an average, these boards undergo periods of surpluses or deficits depending on international market conditions. Their funds, provided by past surpluses, are used to compensate for eventual losses due to cyclical movements in the international markets. To the extent that conditions are favorable in the international markets, the price setting mechanism produces a surplus, acting as a tax. In periods of low international prices, the system produces a deficit, subsidizing local producers. In practice, however, surpluses obtained in good times have sometimes not been sufficient or have not been used to compensate for losses incurred in other periods.⁵⁴ Although data on the variability of producers' incomes are scarce, Sanchez-Ugarte and Modi find evidence that the variability of producers' incomes have been actually larger than that of export earnings in most cases they analyze.⁵⁵

⁵⁴See Gómez-Sabaini (1990).

⁵⁵See Sanchez-Ugarte and Modi (1987).

• *Improvement in the terms of trade.* This objective is feasible only to the extent that the country has an international monopoly on the product or engages in oligopolistic agreements with other producer countries. When that is the case, centralizing international trade to affect prices may benefit the country at the expense of its trading partners. Nevertheless, this strategy is likely to produce only short-term benefits. The supply of agricultural products has often proved to be highly elastic in the long run. In the presence of extraordinary profits, other countries may be expected to enter the market, causing a permanent drop in prices.

State marketing boards and stabilization funds have been complicated in their operation and have often fallen captive to special-interest groups. Lack of transparency in their operation has also prompted sometimes wasteful uses of their revenues and rent-seeking activities.

Taxation through exchange rates

An effect similar to the taxation of exports can be accomplished either by the overvaluation⁵⁶ of the domestic currency or by the establishment of a multiple exchange rate system. In both cases, exchange controls are needed to buttress the overvalued exchange rate. When the relevant exchange rate for exports is higher than its market-clearing level, exporters receive, in local currency, less than the international value of their exports. Again, if the exchange rate is overvalued and the same rate applies to both imports and exports, in effect, importers receive a subsidy at the expense of exporters. When a multiple exchange rate system applies, in which exporters face an overvalued rate while importers face an undervalued rate, the gains from arbitrage accrue to the central bank or result in cross-subsidizing preferential activities.

Although the effects of these mechanisms are similar to a tax on exports, they have rarely resulted in increased government revenue. Instead, the revenue obtained from foreign exchange operations has financed eventual quasifiscal deficits incurred by the central bank. In many countries, overvaluation of the local currency or subsidized exchange rates for imports of selected products have been used for the reallocation of resources. Thus, income effectively generated in export activities has been transferred to urban manufac-

turing industries or to subsidized imports of consumer goods.

The use of distorted exchange rates is specially harmful because it compromises the sustainability of the trade position of the country in the long term. On the domestic front, the induced misallocation of resources and efficiency losses spread throughout the economy owing to the central role played by the export and import industries.

The Rationale for Export Taxation

Market imperfections

The implementation of different forms of export taxes and nontariff barriers to exports—for example, “voluntary” export restraints—have been defended with two arguments based on market imperfections: the optimality of tariffs when the country possesses monopoly power in the export market and the need to respond to the imposition of trade barriers by importing countries.

The first argument is that when a country possesses monopoly power in the market for a product, it can increase its welfare by following monopoly pricing strategies. In particular, an export tax can induce a reduction in the supply of the commodity, thereby increasing its price. Under an optimal tariff, the country maximizes the monopoly profits obtained at the expense of its trading partners. From the viewpoint of the world as a whole, the outcome of this strategy is welfare-decreasing.

Sanchez-Ugarte and Modi analyze existing export taxes in the light of this argument, reaching the conclusion that exports are being overtaxed vis-à-vis the optimal export duty.⁵⁷ Other analyses also point to the irrelevance of the argument in many practical cases.⁵⁸ It has been noted that when the possibility of retaliation is taken into account, the pursuance of monopolistic strategies fails to be optimal. Furthermore, monopolistic positions in agricultural markets are generally contestable. In the presence of world prices substantially above the average cost of production, countries with less comparative advantage than the initial monopolist will enter the market and drive the price down permanently.

According to the second argument, the imposition of trade barriers by importing countries—or the threat of them—may justify corresponding export duties. When a large importing country or a group of coun-

⁵⁶Here, and in the rest of this section, the exchange rate is the price of one unit of domestic currency in terms of a foreign currency. Correspondingly, the exchange rate is overvalued if the price of the domestic currency is higher than the relevant standard—given, for example, by the market-clearing exchange rate or by the purchasing power parity.

⁵⁷See Sanchez-Ugarte and Modi (1987).

⁵⁸See, for example, Bhagwati (1988).

tries introduce import restrictions on a product, its price will increase in the markets subject to restrictions. As a result, domestic producers of the exporting country will have an incentive to overproduce if they expect to sell part of their output in the high-price markets. To neutralize the increase in supply and maintain international prices, authorities of the exporting country can impose a tariff on exports.

Export taxes as a substitute for income taxes

Governments may consider export taxes as a straightforward method of collecting revenue. In this sense, export duties can be considered similar to an excise,⁵⁹ that is, the tax will generate revenue while reducing the level of exports. In many countries, the declared target of the tax is the income of export companies. Export taxes can also be used to tax agriculture and rural producers that are difficult to reach through domestic taxation.

A tax on exports decreases the export price of a commodity relative to its domestic price. Thus, output is redirected toward domestic markets resulting in a distortion of local prices and a misallocation of resources. The tax also creates a "wedge" between the domestic and international prices which leads to further distortions. A tax on exports causes an outflow of resources in the export sector toward less efficient uses. The economy-wide loss in efficiency is similar to that caused by an import tariff. It has also been argued that the supply of exports is relatively inelastic and that, consequently, export taxes are nondistortionary. Empirical evidence shows, however, that the supply of exports is affected by changes in producer prices.⁶⁰

Furthermore, high export revenues do not always correspond to high profits. Domestic income taxation avoids anti-export biases and targets directly the intended tax base.

Stabilization purposes and windfall gains

Export taxes have been defended as a mechanism to diminish the volatility of earnings in the export sector and the international and domestic price of exportables. The first-best solution is to make use of the market for that purpose, that is, to use futures and financial derivatives to sterilize risk and to implement insurance schemes of voluntary participation and subject to competition. If producers or exporters derive any gain from stabilizing their earnings, they will be willing to enter into insurance contracts.

It has also been argued that export taxes can be used to tax away windfall gains. These gains, prompted by unexpectedly high international prices, can be considered rents. When the tax is applied, it is too late for the exporters to modify their economic behavior. Thus, the tax is nondistortionary and, hence, efficient. Nevertheless, the case for the efficiency of export taxes only holds if the levy is not anticipated. That is, the argument could justify a one-time unexpected levy; it does not justify recurrent taxes on exports. If exporters anticipate that the government will impose a tax on exports in the event of high earnings, they will modify their economic behavior accordingly. Moreover, exporting activities are not a one-shot game. Once the government has levied an unexpected tax on exports, although exporters cannot modify their past behavior, they will modify their future behavior. They will assign a high probability to a similar tax being levied again when similar circumstances occur.

⁵⁹See Tanzi (1976).

⁶⁰See Sanchez-Ugarte and Modi (1987).

Taxation of Income

Source Versus Residence Principle

ANGELO G. A. FARIA

- *How should international income be taxed using the source and residence principles?*

Taxation of productive factors in an economy—whether directly or indirectly—involves balancing national against international considerations. At the national or “closed economy” level, policymakers are concerned with the revenue, allocative efficiency, and equity consequences of taxes viewed as explicit factor price wedges that influence savings and investment decisions exclusively within the domestic economy, but without any leakages. With extension to a global or “open economy” context, however, such purely national tax systems can exert profound effects on the volume and allocation of international production factors and vice versa, the consequences being crucially dependent, for any one country, on its relative economic standing in the global economy. These effects arise because the factor returns and the underlying tax bases straddle national boundaries, thereby creating the scope for built-in conflict and competition in demarcating tax jurisdictions.

To deal with such conflicts, there are essentially two conceptual adjustments, supplemented by explicitly negotiated schemes of tax harmonization or coordination. One set relating to direct taxation is represented by the residence and source principles. Analogous to these for indirect taxes, such as VAT, are the origin and destination principles. In this section, we consider only the first set of principles.⁶¹ These must be regarded as polar principles, and countries in practice adopt some composite, reflecting the growing integration of factor markets (especially capital markets).

The Residence Principle

This principle—also denoted as the nationality or domicile principle—asserts that natural persons, or individuals, are taxable in the country or tax jurisdiction in which they establish their residence or domicile, regardless of the sources of income. For a legal person, or

nonindividual legal entity, establishing residence is less clear-cut, although it has increasingly been tied to the location where its business activities are registered and/or its management and control are effectively exercised. In some countries—notably the United States, Canada, and Australia—the concept of residence is more narrowly and legally defined in terms of nationality. In these countries, a natural person is taxable on the basis of his citizenship rather than physical residence, while a legal person is taxable in the place of its registration or incorporation rather than where it carries out its activities. From the standpoint of taxation principles, taxing factor income based on residence more closely approximates the equity or ability-to-pay principle. In relation to capital income, a wholly residence-based tax, because it focuses on the residence of the saver, can be viewed as a tax on the ownership of capital and thus on savings.⁶²

The Source Principle

The source principle asserts the prior, and even sole, claim of the source country, or country in which the income arises to natural or legal persons, to tax such income without reference to other criteria or physical presence or legal residence. Clearly, taxing income on a source basis is *ad rem* in nature and approximates the benefit principle. It also amounts to a tax on the location of capital, or investment, because it disregards the status of the investor in favor of the siting of the investment.⁶³

Application of the Residence and Source Principles in Practice

Taxation of income by adherence to pure principle is tantamount to taxing net national product (residence principle) or net domestic product (source principle) because the former taxes residents' worldwide income and the latter all income produced by domestic factors irrespective of their owners' residence.

In practice, as noted above, countries have tended not to stay with the pure application of one or other principle, but to apply a mix of residence- and source-based direct taxation, the former for nationals residing

⁶¹The origin and destination principles are discussed in Chapter III.

⁶²See Frenkel et al. (1991).

⁶³See Musgrave (1987).

in the country and the latter for income earned within the country by nonresidents and/or nonnatural persons. The precise nature of mixes has depended on each taxing jurisdiction's perception of the relative importance of a number of factors, notably the attractiveness of foreign investment, the revenue implications, the domestic administrative capabilities, and the degree of cooperation with competing jurisdictions that it can expect.

Regrettably, even such mixes have not tended to be uniform, thus resulting in potential double taxation of the same income. For example, developing countries, as a broad group, have generally forgone taxing foreign income of residents primarily on grounds of administrative expediency or because the level of income involved was relatively modest, rather than because of a commitment to the source principle. On the other hand, in taxing the domestic source income of nonresidents, they have had to balance their ever-present revenue needs with the resulting disincentive effects on the foreign investor who computes the user costs of capital and services on an after-tax basis.

For developed countries, the concerns are somewhat different because they generally face a relatively more balanced two-way movement of production factors and resource flows among themselves, and a one-way movement toward developing countries. As a result, they remain much more concerned with issues relating to the incidence of taxes on production factors. They each view such incidence essentially from the perspective of a home country trying to approximate the application of the residence principle to the worldwide income before tax of its residents, while continuing to tax domestic source income of nonresidents at an equivalent rate. This explains their interest in transforming the tax principles of residence and source through the provision of tax credit rather than a tax deduction from income for tax levied in a competing tax jurisdiction, within the framework of tax treaties.

Relief from Double Taxation

ANGELO G. A. FARIA

- *Should double taxation of income be reduced through granting income deduction or tax credit?*

When a tax jurisdiction in the home country (i.e., in which the taxpayer is resident) is faced with taxing the foreign-source income of residents and/or the domestic-source income of nonresidents, double taxation of

such income would normally result. In principle, this could be mitigated if all countries were to harmonize their treatment of cross-border income flows by agreeing to accept either one or other of the residence or source principle as the single organizing principle in their international tax relations. This is generally not feasible, however, because restriction to the residence principle would for developing, capital-importing countries deprive them of what they regard as a fair share of their somewhat limited tax base, while restriction to the source principle would for developed, capital-exporting countries be viewed as compromising the equity characteristics of their tax systems. Hence, the only practical choice available to a domicile-taxing jurisdiction wishing to minimize departures from neutrality in the taxation of productive factors is to introduce unilateral tax relief. In due course, it may also seek to negotiate bilateral tax relief through tax treaties.⁶⁴

Unilateral tax relief against double taxation by a taxing jurisdiction or country of a resident's foreign-source income can take two forms. First, through *income deduction*, under which such income, when it accrues, is wholly exempted, or is assessed net, after deduction of foreign taxes which are treated as charges or costs. Alternatively, such net income may be assessed only when it is repatriated—the so-called deferral provision. Second, such income may be assessed on a gross basis, but a partial or full *tax credit* in respect of tax paid in the source country would be offered. Neither form is ideal from the standpoint of international equity or neutrality, in part because an equiproportionate distribution between revenue gain to taxing authorities and sacrifice to taxpayers cannot unambiguously be assured.

The income deduction approach

For a home country, the deduction approach clearly yields more revenue and is simpler to apply and administer. Revenue gains would result when the home country rate was equal to or higher than the foreign country rate. The simplicity in application is due to the equivalence of net income as determined under the home and foreign country tax codes not having to be established. For example, with a multinational firm operating in several tax jurisdictions, it is always problematical to establish net profits and resulting tax burdens in relation to the true levels of gross income and associated costs, which is applicable to a particular taxing jurisdiction. This is because such cross-border activities give rise to complex trading arrangements by the firm at less than "arm's length" involving transfer prices.

⁶⁴See Mutén (1983).

ing, intercorporate subventions, royalties, etc., to reduce the total tax burden. A deduction system obviates the problem of what taxes should properly be allowed as equivalent to an income tax, or whether different nominal rates exist, by treating all foreign taxes as profit-abating charges or costs.

The tax credit approach

On the one hand, these advantages of the income deduction approach represent the mirror image of the disadvantages of the tax credit approach. On the other hand, the latter's principal advantage is that it eliminates or at least reduces the double taxation burden, depending on whether full or partial credit is given. From the standpoint of tax incidence, granting full tax credit for foreign tax would mean that a resident in his home country would effectively be taxed on the residence principle applied to his (before tax) worldwide income because he pays the same tax rate on his domestic source and foreign source income. Moreover, it brings the foreign country closer to an effective source principle by reducing the combined tax rate (home plus foreign) on a nonresident's income in the foreign country. Of course, this outcome is weakened when the foreign tax rate is lower than the corresponding domestic tax rate, thus limiting the tax credit given in the home country to the latter rate.

Aspects of Tax Treaties

ANGELO G.A. FARIA

- ***What are tax treaties between countries designed to do?***

Where the inherent conflict between the residence and source principles of taxing income is not unilaterally resolved through a residual tax crediting or an income deduction approach, competing tax jurisdictions can more rationally avoid or reduce double taxation through concluding tax treaties. In fact, such treaties have initially been contracted on a bilateral basis between developed countries where there has been a mutuality of interest allied to a rough balance of income flows between the contracting parties. Over time, however, these treaties have been marked by significant divergences relating to concepts, structure, and operating rules.

To promote greater uniformity in cross-border tax treatment of income, ad hoc groups of experts or governmental representatives have attempted to shape generally acceptable international rules in the form of multilateral tax conventions or guidelines. These rules

address objectives in tax relations between source and residence or domicile countries, such as the assignment of specific taxes, a standardized definition of the tax base and its appointment, limitations of tax rates by source countries, and alleviation of double tax burdens. As examples, an Andean model was published in 1971, a revised OECD convention in 1977, and a United Nations convention in 1981. While industrial countries have generally preferred the residence or domicile type of treaty (extended in the case of the United States to emphasize its nationality orientation in taxing worldwide income), developing countries have sought to assert the source principle especially for income from movable capital.

Tax treaties cover a wide number of complex and conflicting conceptual and technical concerns of the contracting parties about sharing income-taxing jurisdiction. They distinguish in particular between primary income earned on "immobile" factors and secondary income from "mobile" factors. In this section, rules of accommodation for only a few of these will be highlighted.

Permanent establishment

The concept of "permanent establishment" has evolved over time in importance because it represents the litmus test between trading *in* a country and trading *with* a country.⁶⁵ Once it is accepted that trading is taking place in the source country through a permanent establishment, its right to share in the resultant tax base is unambiguously established. Thereafter, the relative shares of the source and domicile country can be established through arbitration between them. Trading in a country through a permanent establishment implies, for any business, its having a fixed presence (e.g., office, factory), carrying out business activities over an extended period, or habitually exercising an independent status in negotiating contracts. By contrast, where a business maintains a merchandise stock exclusively for purposes of auxiliary activities such as storage, display or delivery, or trades through a broker or general commission agent, it is considered to be trading with the source country and thus not to be taxable by the latter.

In practice, source countries attempt to expand the interpretation of permanent establishment including auxiliary activities such as trading, while domicile countries take the opposite stance. For both groups, the principal consideration has to do with widening their respective tax bases and thus augmenting potential tax revenue. This is especially the case for develop-

⁶⁵See van den Tempel (1967).

ing countries whose purely domestic tax bases are relatively narrower, leading them to press for the source-based taxation even of auxiliary trading activities. On the other hand, domicile country positions are influenced primarily by the need to ensure equitable tax treatment of resident nonnationals and nationals, and to reduce residual double taxation that may otherwise result through the application of the foreign tax credit.

Once trading through a permanent establishment is confirmed, the tax base still needs to be defined. A particular problem is whether dividends, interest, and royalty payments should be taxed on a gross or net basis. Generally, because of administrative difficulties in establishing genuine or "arm's-length" cost-price relationships between the domestic subsidiary and its foreign parent, source countries prefer the net basis. Residence countries, on the other hand, prefer the gross basis, but seem more disposed to accept at face value the estimates of costs relating to such foreign income.

Dividends

The tax treatment of corporate distributions is a particularly difficult specific problem faced in concluding tax treaties, in addition to the general difficulties arising out of the source versus residence approaches to taxation. This is because countries have differing views on whether, for tax purposes, a corporation should be viewed as distinct from its shareholders, and also on whether there should be differential tax treatment of retained and distributed corporate profits to provide incentives for reinvestment.

Traditionally, dividend income is treated as taxable in the country of residence/domicile of the shareholder. On the other hand, the country in which the distributing corporation has its fiscal domicile is also recognized as having the right to tax dividends paid out to shareholders, in addition to taxing the corporation itself, based on the source principle. The inherent conflict in the unrestricted application of these two approaches can be reduced within the framework of tax treaties by reciprocity provisions. Developing countries' desire to capture some part of the profits distributed to foreign shareholders without excessive administrative difficulty is agreed to under such provisions by, for example, a final withholding tax ranging from 15 percent for natural persons to 25 percent for legal persons. The recognition by capital-exporting countries of the right of the source country to tax dividends is a development of some significance for developing countries. Nevertheless, foreign corporations have invested in capital-importing countries using a

branch instead of a subsidiary, thereby hoping to escape with payment of tax on profits only and not of distributions of these profits to shareholders. This is because branches earn profits exclusively as dependent agents for their headquarters, whereas subsidiaries exercise independence in earning and distributing their profits to shareholders, the principal one being the parent company.

Interest

As with dividends, the traditional attitude is to give the investor's domicile country the principal right to tax interest payments arising from debt claims of every kind, irrespective of whether these are secured by mortgages or carry the right to participate in profits. Increasingly, however, tax treaties recognize the right of the source country to have a limited share of the tax base through imposition of a modest withholding tax on recipients, say 10–15 percent on the gross amount of interest. This modest rate reflects the recognition that lenders, being interested only in net interest rates, will be influenced adversely if a high tax rate lowers their net return to lending. On the other hand, borrowing countries tend to view low taxation of interest payments as encouraging excessive debt rather than equity financing of business operations, thus serving a mechanism for reducing their true share of the tax base.

Royalties

Royalties or rental payments are made as a consideration for the use of, or the right to use, any copy-righted patent.⁶⁶ Examples include films, tapes, trademarks, secret formulas or processes, and commercial or scientific equipment. Here again, there is scope for conflict as regards the taxing rights of the debtor and creditor country. This conflict relates primarily to whether such payments should be taxed gross or net after permitting costs; and, secondarily, where the patent is used in several countries with varying degrees of application, how to establish a source or debtor country's share of gross payment and associated costs.

Capital gains

The taxation of capital gains also presents difficulties, in large part because taxing jurisdictions have an even wider than normal variation in the tax treatment of such gains and, to a lesser extent, on whether these are from short-term financial assets or longer-term real assets. The general consensus is that where gains arise from the sale of business property, the source country

⁶⁶OECD (1992).

is entitled, together with the domicile country, to levy tax on these gains. This is because the asset sold formed part of a "permanent establishment" for trading in the source country. All other capital gains are normally taxable in the domicile country because this condition is not present.

Tax sparing

This refers to a scheme for allowing the "spared" tax on income arising to a foreign investor in a capital-importing source country to accrue to his benefit fully and directly, rather than perversely to become a revenue transfer from the source-country treasury to that of the domicile country. Thus a domicile country that applies the foreign tax credit would, under tax sparing, allow the spared tax to be fully credited against its own tax. While such relief can, in principle, be provided unilaterally, in practice, it is used as a "sweetener" by capital-exporting countries to encourage capital-importing countries to contract double taxation arrangements with them. The United States does not support tax sparing because it holds the view that it encourages short "fly-by-night" investments because it provides no incentive to reinvestment. Accordingly, the United States takes the view that "tax deferral"—or their delayed taxation from time of accrual to time of repatriation—of the undistributed profits of foreign affiliates is preferable because it promotes long-term investment in capital-importing countries.

Exchange of information

Tax treaties generally contain some provision for the exchange of information with tax implications between national tax jurisdictions. Normally, a country seeking information from another country would limit itself to seeking the kind of information that would be available to it within its own borders. Thus, the exchange should pose no special problems. One area which does pose particular difficulty, however, concerns obtaining information about taxpayers from their bankers because taxing jurisdictions differ about both their power to obtain such information and the prior conditions that need to be satisfied. Generally, capital-exporting countries which tax wide income on a residence and/or nationality basis are especially interested in contracting tax treaties with broader information exchange provisions; by contrast, capital-importing countries taxing on income source basis have a less pressing need to do so, except in cases where a multinational business subsidiary enterprise trading by way of a permanent establishment is suspected to be engaged in less than arm's-length transfer pricing or of head office arrangements with its parent.

International Capital Flows

ANGELO G.A. FARIA

- *How should the returns from international capital flows to capital-importing and capital-exporting countries be taxed?*

International capital flows imply the existence of exporters and importers of capital on a gross or net basis, each group with its specific views of the marginal social cost and return on investment after allowing for risk differentials. On a gross basis, countries can be both importers and exporters of capital. On a net basis, however, industrial countries as a group are exporters while developing countries are net importers. This stylized feature of the global economy figures prominently in the traditional analysis which implicitly assumes countries to be in rough balance as both capital exporters and importers.

International capital flows are clearly influenced, *inter alia*, by the total taxation burden of income arising from the claims of overlapping national tax jurisdictions.⁶⁷ An economically efficient system of global taxation of income returns from such flows would be one characterized by "tax neutrality" in which business decisions relating to location of investment were unaffected by international differentials in tax rates or types of tax treatment. A more realistic view of tax neutrality would be to see it as a standard against which the distortionary effects of taxation on investment and savings, both intended and unintended, could be minimized through mechanisms such as a foreign tax credit and income exemption and even multilateral tax treaties.

Two established and theoretically optimal concepts of tax neutrality in relation to capital flows have been well explored.⁶⁸ Viewed from the standpoint of across capital-exporting countries, capital export neutrality (CEN) prevails where the tax system is neutral toward the export of capital in the strict sense that investors face the same marginal effective tax rate on total return from similar investments at home or abroad. Given the assumption of equivalence in marginal effective tax rates, capital export across countries would then be based upon an after-tax rate of return to investment which reflected purely nontax factors related to the marginal productivity of capital. In practice, this highly unlikely outcome could only emerge when uniformity

⁶⁷Transactions taxes on currency conversions may also influence capital flows (see Tobin (1978)).

⁶⁸See OECD (1991).

across countries in the definition of the tax base resulted in investors being taxed on accrued worldwide income and receive full credit against domestic tax liability for all tax.

"Capital import neutrality" (CIN) postulates that all investors in one particular residence or domicile country are subject to the same tax treatment, namely, that of the source country of the investment income. This implies that both domestic and foreign suppliers of capital in the source country obtain the same after-tax rate of return on their investment. For CIN to be fully effective in practice, this nondiscrimination in source countries will have to be combined with nondiscrimination in the residence countries—again a highly unlikely outcome in practice.

In evaluating their relative merits in practice, a good starting point would be to ask the relative global priority of moving toward one or the other, and securing a more efficient allocation of savings or investment.

CEN has been sometimes preferred to CIN in achieving economic efficiency—assuming that private savings are inelastic with respect to the after-tax rate of return—because equalizing the marginal productivities of capital across uses and countries tends to result in a maximization of global output from a given global stock of capital.⁶⁹ Against the supposed advantages of CEN, one may recognize that business taxes can be viewed as benefit-type taxes or user charges for public services so that different tax rates neutralize differences emanating from the expenditure side of the budget which, under a crediting system, would be maintained. But given the general difficulty associated with administering a pure credit system necessary for CEN, and that capital has become the most mobile factor in an increasingly interdependent world, it may be that the foreign income exemption provided by CIN and its emphasis on after-tax rates remains appropriate.

International Transfer Pricing and Taxation

WILLIAM J. MCCARTEN

- *Why do transfer pricing practices raise problems for income taxes?*
- *What is the preferred approach to dealing with those problems?*
- *How serious are such problems in practice?*

⁶⁹See OECD (1991)

- *What lessons can be drawn by developing countries from international experiences of dealing with these problems?*

Defining the Problem

Allocating the global income of multinational enterprises, MNEs, among fiscal jurisdictions for tax purposes is a major source of conflict between tax authorities and the enterprises concerned. Much of this allocation is carried out by setting transfer prices.

In the context of international trade, a transfer price is the price for the internal sale of a good or service in intrafirm trade, that is, in trade between branches or affiliates of a single business enterprise located in different countries. Transfer prices are administrative prices set by the management of transnational or multinational enterprises. If management wants its branches and subsidiaries in different countries to operate as independent profit centers, then it may set these prices as close as possible to the prices that would prevail in market transactions between unrelated purchasers and sellers. Tax considerations, however, may influence management to reject such a profit center or "shadow" pricing strategy. The setting of transfer prices will affect the global tax burdens of multinational enterprises because both import and company taxation of enterprises are based on input and output prices, and effective tax rates vary greatly among countries. Their discretion over price setting gives MNEs the opportunity to design sets of transfer prices for intrafirm trade which reduce their global tax liability or achieve other strategic aims, such as overcoming foreign exchange restrictions. Consequently, jurisdictions with moderate or high business income tax rates are vulnerable to tax base erosion on the revenues they receive from taxpayers with transfer pricing opportunities.

The problem for national tax authorities is to establish and enforce rules for the setting of such prices. Considerations of self-interest should lead governments to regulate transfer pricing in ways that minimize conflicts with other jurisdictions and do not discourage future investment, while, at the same time, safeguarding their revenue bases.

International Guidelines and the Arm's-Length Standard

One way to avoid international conflict over double taxation issues and to foster a favorable business climate in the host country is for the tax authorities to adopt regulatory criteria that command the support of

international bodies. Fortunately, a consensus exists among the Organization for Economic Cooperation and Development (OECD),⁷⁰ the United Nations,⁷¹ and the European Community⁷² that a single guideline should be employed both by enterprises for setting transfer prices and by taxing jurisdictions in their assessment. This guideline is *the arm's-length criterion*. As will be discussed later, however, the arm's-length criterion is not without its critics. An arm's-length price is the market price that would have been negotiated by unrelated parties engaged in the same or similar transactions under the same or similar conditions. To prevent the use of transfer price setting for tax avoidance, most countries have established their right to adjust reported transfer prices to conform to an arm's-length standard. Implementing the arm's-length principle has proved to be a difficult task for both the multinationals themselves and the tax authorities who regulate them.

OECD Guidelines for Determining Arm's-Length Price

Following closely on U.S. practice, the OECD endorses four methods of determining arm's-length prices. These are (1) the comparable uncontrolled price method (CUP); (2) the resale price method; (3) the cost plus price method; and (4) any other method which is found to be acceptable, known collectively as *fourth methods*.⁷³

The *comparable uncontrolled price (CUP) method* assumes that a known comparable uncontrolled price exists for the sale or purchase of the same or similar goods to or from independent third parties. Market conditions associated with a proposed CUP exchange should be similar to those which characterize the actual transfer price exchange. Even if an MNE is aware of the appropriate CUP for a given intrafirm trade transaction, tax authorities in a host country may not be able to identify it owing to the informational asymmetry between MNEs and the authorities. Where no close CUP exists, authorities will be tempted to impose observable spot prices for transactions which are superficially similar. This approach can lead to serious distortion in the allocation of profit within MNEs, across taxing jurisdictions. For instance, MNE affiliates occasionally operate at a loss, particularly in developing companies, for strategic reasons such as maintaining market share or retaining security of access to raw materials during a period of weak market demand.

The *resale price method* takes, as its point of departure, the price at which a product passes beyond the limits of the multinational enterprise through a sale to an independent purchaser. A markup is next subtracted from this price to reflect the costs and profit margin of the foreign-based unit of the enterprise which purchased the good from the producing unit and resold it to the independent purchaser. The residual is deemed to be the arm's-length price of the original sale. This method is most applicable to cases where the reseller does not add substantially to the value of the product—but is essentially a distributor. For the method to work effectively, comparable markups of independent distributors need to be found.

The *cost plus price method* is based on the supplier's cost of the resources used in production of a particular commodity to which an appropriate profit markup is added. The cost plus method is beset by many problems. Like the resale price method, it ignores demand or business cycle conditions and fails to reflect competitive conditions; in addition, it overemphasizes historical costs. This approach is most readily applied in pricing a subsidiary's output in cases where only one or a few products are produced, where the subsidiary performs the role of subcontractor, or where a specialized product has been produced, tailored to the needs of a specific customer—that is, where there are no important manufacturing intangibles. Finally, employing this method in a satisfactory manner requires the determination of an appropriate profit markup and the identification of appropriate costs of production.

The *fourth methods* of acceptable alternatives include a wide mixture of techniques with different rationales, including profit-splitting according to allocation formulas based on sales, and expected or normal returns on capital invested by an affiliate.⁷⁴

MNEs may occasionally favor the application of fourth methods in their own transfer pricing as a means of self-assessing the profit level that a host country's revenue authority might anticipate from them. If a steady accounting profit is expected by the authorities, irrespective of changes in business conditions, an MNE may reason that it is prudent to generate such an outcome to avoid investigations or the hostility of the host government.⁷⁵

The first three methods may be effective when dealing with tangible commodities. They are, however, often unworkable in cases where payments are made to the parent corporation for the use of intangible ser-

⁷⁰See OECD (1979). The arm's-length standard is also recognized in Article 9 of the OECD model tax convention. See OECD (1992).

⁷¹See United Nations (1978).

⁷²Commission of the European Communities (1992).

⁷³See OECD (1979), p. 33.

⁷⁴See OECD (1979), pp. 42–43.

⁷⁵See Alworth (1988), p. 223.

vices such as intellectual property, management fees, and other services, which are unique to the parent. Furthermore, tangible property often incorporates important intangibles: for example, not all cars are alike.

How Serious a Problem Is Transfer Price Manipulation?

How serious a problem is transfer pricing for developing countries? Statistical evidence on the growth of the intrafirm component of international trade suggests that the proportion of trade likely to involve transfer prices has increased sharply over the last two decades. Hence, the opportunity for transfer price manipulation has increased, and with it, the danger of revenue erosion from high-tax countries. For example, in 1989, 86 percent of U.S. parent-company imports were from foreign affiliates, while 89 percent of U.S. parent-company exports were destined for foreign affiliates.⁷⁶ A related important secular trend in international trade has been the growth in services as a component of total trade. With the increased importance in total trade flows of such intangible items as royalties and license fees, the scope for tax avoidance through price manipulation has increased correspondingly. It is very difficult to determine comparable uncontrolled prices for these items and even to determine where such services are performed. Therefore, manipulative price-setting of these services may be one of the most preferred avenues for global tax avoidance.⁷⁷

Nevertheless, substantive arguments can be made which suggest that MNEs do not abuse their transfer price-setting power to avoid taxes in developing countries. Multinationals may refrain from manipulative transfer-pricing practices in developing countries because (1) marginal corporate tax rates are typically lower in developing than in developed countries, and (2) in cases where the parent enterprise is resident in a country with a foreign tax credit system, corporate taxes paid in a host country can be credited against the tax liability imposed by the home country on remitted profits. At the empirical level, a recent study of transfer-pricing practices in the petroleum industry involving the United States and petroleum-exporting countries concluded that, between 1974 and 1984, MNEs in this industry did not substantially manipulate transfer prices.⁷⁸

To reach a balanced assessment, however, this sanguine picture needs to be contrasted with important qualifications and counterarguments. First, the deduc-

tive arguments ignore the role of tax havens which seek to attract the paper profits of MNEs by guaranteeing a regime of little or no taxation. Relatively stateless MNEs may locate their head offices in such havens to facilitate global tax avoidance, though real control and the source of investment lie elsewhere. In addition, MNEs with headquarters in industrialized countries may require branches and affiliates in capital-importing countries to purchase inputs through other subsidiaries located in tax havens. Second, the assumption that marginal corporate tax rates in developing countries are lower than those found in industrial countries is not valid for a number of Asian and African countries.⁷⁹ Finally, in setting transfer prices, MNEs may be influenced by considerations other than global tax minimization. They may inflate their input prices as a means of circumventing exchange controls and other restrictions on profit repatriation. They may also wish to disguise the extent of economic rents actually earned in the host economy. High rents may lead to demands for higher wages for affiliate workers and political demands that the host country revamp its tax regime to capture more economic rent.

Finally, it is important to realize that, while abusive transfer-pricing practices may affect a very small proportion of tax revenues in large industrial countries, they can affect a very significant proportion of the tax revenue of a small, poor country when there is significant foreign investment in that country.

Experience of Developed Countries with Transfer Price Regulation

While policy guidelines in industrialized countries usually favor use of the CUP method and discourage recourse to fourth methods, the empirical evidence on transfer-pricing practices suggest that fourth methods are employed more often than any other approaches. Three ex post studies of methods used in resolving U.S. transfer-pricing cases found that fourth methods were used between one third and almost one half of the cases, while the CUP method was the second most likely method to be selected.⁸⁰

Two promising approaches to curtailing transfer-pricing abuses are international cooperation through the exchange of tax information between revenue authorities in different countries, and advance-pricing

⁷⁶See Hufbauer (1992), pp. 108–09.

⁷⁷See Kopits (1976), p. 86.

⁷⁸See Bernard and Weiner (1990), pp. 123–60.

⁷⁹For example, as of 1992, a number of developing countries including India, Bangladesh, Malawi, Sri Lanka, and Zimbabwe retain company or business profits tax rates above 40 percent. See Bagchi (1991), p. 45.

⁸⁰The studies are the 1981 General Accounting Office report and the 1984 and 1987 Internal Revenue Service surveys cited in U.S. Department of the Treasury (1988); and in Hufbauer (1992), pp. 111–12.

agreements (APAs). An advance-pricing agreement provides a means of avoiding uncertainty about the acceptability of MNE practices. This approach, adopted by the United States in 1991, guarantees the enterprises concerned advance approval of their transfer-pricing methodologies, if adequate documentation is provided. The recent report of the European Community on company taxation, known as the *Ruding Report*, has endorsed the practice of advance-pricing agreements between the tax authorities and MNEs. The *Ruding Report* suggests that countries involved in intrafirm trade might conclude advance transfer-pricing agreements between each other. This practice has already been initiated by Australia and the United States.⁸¹ Simultaneous audits of affiliates of a single MNE in two or more countries have also been undertaken.

Experience In Developing Countries

Tax administrations in most developing countries are poorly equipped to cope with transfer-pricing issues. In particular, they tend to lack the technical expertise needed to challenge prices set by MNEs using the methodologies recommended by international bodies for the establishment of arm's-length prices. In many cases, developing countries appeal to international guidelines when making transfer-price adjustments halfheartedly. Tax statutes in many developing countries often equate arm's-length dealings with uncontrolled market prices and omit rules for establishing transfer prices when comparable uncontrolled market prices are unavailable. In such situations, the administrative response is often to make arbitrary price adjustments or adjustments which are the outcome of implicit bargaining, while seeking to cloak actual practice under the veil of internationally approved guidelines.

Some developing countries have enacted ad hoc and simple rules which do not provide comprehensive solutions, but nevertheless address particular facets of the problem. These approaches include alternative minimum corporate taxes based on turnover, use of royalty fees based on the volume of natural resource extraction, and the disallowance of deductions, such as royalty payments and interest payments on equity infusions by foreign-based parents.

Examples of these strategies pursued by some Latin American countries are disallowing the deduction of royalties paid to related foreign entities for technological contributions, restrictions on the size of deductions for expenses incurred abroad, and establishing pre-

sumptive income for certain activities such as international transport, where the use of separate accounting is particularly difficult.⁸² These rules have had mixed success. Those that disallow the deduction of royalties or limit deduction of expenses have proved ineffectual, because MNEs will find other methods to repatriate profits from host countries without incurring significant tax liabilities.

Policy Lessons for Developing Countries

As a first step in articulating regulatory policy, developing countries should enact legally enforceable measures against those transfer-pricing practices which are intended to erode their tax bases. In designing these measures, authorities should consider their own national legal traditions. The enactment of transfer price statute provisions will signal that the host government intends to combat manipulative pricing practices and may thereby dissuade potential tax evaders.

If the revenue authorities in a developing country are unable to obtain comparable uncontrolled prices, which of the other two methods sanctioned by OECD guidelines—the resale price method and the cost plus price method—should they use? In principle, the option that should be preferred depends on where the intangibles are located. But practical considerations are likely to be more important in many instances. For example, a developing country will generally have access only to the records of the subsidiary. If a manufacturing subsidiary in the developing country sells to its overseas parent for distribution, the developing country will be unable to apply the resale price method. Nevertheless, developing countries have had some success in adjusting MNEs' transfer prices under the resale price method, when the output is a homogeneous product quoted on an international exchange such as the London Metal Exchange.⁸³ These approaches should be used with caution, if the observed commodity exchange price is for a refined commodity many stages removed from the intrafirm trade transaction. In those cases, adjustment should be made for the downstream value added associated with refining and transportation. Failure to make the necessary adjustments for intermediate value added may produce serious tax distortions and discourage production.⁸⁴

⁸¹See Casanegra de Jantscher and Mansfield (1989), pp. 166–67.

⁸³For example, in Jamaica, a production levy is imposed on bauxite producers which is based on a fixed percentage of the price at which aluminum ingots are sold on the open market in the United States.

⁸⁴See Conrad (1991), pp. 727–47.

⁸²See Daly (1992), p. 1073.

Country experience suggests that royalty and management fees have been an attractive avenue for remitting profits to the capital-exporting country. Many capital-importing countries employ formula restrictions both on the deductibility of such payments and on the actual repatriation of funds under these categories. A less drastic alternative is to impose withholding taxes at moderate rates on nonarm's-length royalties and other fees paid abroad. Quantitative restrictions or outright disallowance might still be warranted in cases of such payments to affiliates in known tax havens. While the OECD model tax treaty advocates that royalty payments abroad not be subject to a withholding tax, it does so only for the case of arm's-length transactions.

Revenue authorities should be diligent in identifying sham transactions and questioning transactions involving the purchase of services from related companies in known tax havens. They should also explore opportunities for international cooperation in the form of tax information exchanges or even simultaneous audits with their counterparts in countries where the parents of their most important subsidiaries reside. These developments can be facilitated by negotiating provisions for exchange of information and other types of cooperation in tax treaties.

Countries may wish to make provision in their legislation for advance rulings. This option should be attractive to a great many MNEs because it would avoid capricious outcomes, wasteful litigation and the uncertainty associated with prolonged disputes. When advance ruling and negotiable agreement are difficult to conclude, host countries may wish to explore the use of international arbitration services such as those provided by the United Nations.

In cases where import tariffs are high or where the enterprise becomes liable to sales taxes on its imports, an MNE may attempt to minimize the price of imported goods by underinvoicing. Customs and income tax departments need to cooperate closely in their tax surveillance activities to ensure that subsidiaries do not adopt a double invoicing system with low prices for customs and high prices reported to the income tax authorities.

Critics of the arm's-length criterion emphasize its lack of workability, particularly for developing countries, the long delays in resolving disputes arising from its application, and the high costs incurred by tax authorities who attempt to apply it rigorously. They offer as an alternative the universal apportionment method which would assign the global profits of MNEs among tax jurisdictions based on apportionment formulas.

These formulas might contain as components the wage bill or value added of affiliates, the book value of assets, and sales. While such an apportionment approach has been successfully implemented at the state level in federal countries, it has not been applied in the international setting except by the countries of the Andean Pact. Using a universal apportionment formula to allocate the global profits of enterprises operating in both high- and low-wage countries will not produce a desirable tax allocation from the perspective of the latter group of countries, if the wage bill is an important component of the formula. Moreover, regionally based initiatives to replace the arm's-length standard with formula apportionment would be likely to lead to different formulas in different jurisdictions.

Despite the shortcomings of current international guidelines on transfer pricing, they are unlikely to undergo radical alteration in the future. Therefore, the most effective strategy for developing countries that wish to safeguard their tax revenue bases against abuses of international transfer prices is to devote adequate resources to transfer-pricing regulation within the framework of international guidelines.

Treatment of Subsidiaries and Branches

WILLIAM J. MCCARTEN

- *What is the difference between subsidiaries and branches, as forms of business organization?*
- *What are the tax and nontax advantages and disadvantages of the two forms of organization, from the perspective of a foreign investor?*
- *What justification is there for imposing a special tax on branch profits?*
- *What is the problem of "thin capitalization," and how has this problem been tackled in different countries?*

As a general principle, countries should be guided in their tax treatment of branches and subsidiaries of foreign-based enterprises by a desire to achieve neutrality across organizational forms as well as by the need to generate revenue. Complexity is likely to arise in this area of taxation because of the difficulty of harmonizing domestic tax policy objectives with international tax policy guidelines and the provisions of foreign tax regimes.

Defining Branches, Subsidiaries, and Permanent Establishments

A foreign-based enterprise which carries on business operations in a host country, but has not incorporated in the host country, has established a *branch*. Under a branch, the foreign enterprise usually faces unlimited liability for the debts and other legal obligations of its branch. In contrast, if the foreign-based enterprise incorporated its business in the host country, then a *subsidiary* exists. Under the subsidiary, liability is limited to the assets of the subsidiary in the host country. An important related concept is that of a *permanent establishment*.

A *permanent establishment*, as defined in article 5 of the *OECD Model Tax Treaty*, is a fixed place of business through which the business of an enterprise is wholly or partly carried on.⁸⁵ This definition excludes certain activities of a foreign resident in a host state such as conducting business in that state through a broker or general agent or maintaining inventories of goods in the host state for delivery to an agent or purchaser. Once a foreign person acquires a fixed place of business or employs resident individuals, the enterprise is deemed to have set up a permanent establishment. The income producing activities of a business are generally taxable once that business sets up a *permanent establishment* in a tax jurisdiction. A corollary of this guideline is that foreign persons should not be subject to branch taxation if they have not engaged in activity giving rise to a permanent establishment.

In general, international conventions and bilateral treaties take the view that the profits to be attributed to a permanent establishment are those it would have made had it not been dealing with its own head office, but with an entirely separate enterprise under *arm's-length conditions*. If separate accounts do not exist, then revenue authorities will apply the arm's-length principle in ascribing a profit to the establishment.

Advantages and Disadvantages of Operating as a Branch or a Subsidiary

Nontax considerations

The decision of a foreign-based enterprise to carry on a business as a branch or as a subsidiary will be influenced by both tax and nontax considerations. Among nontax considerations are the type of industry in which the foreign investor intends to operate; the degree of financial liability that the investor wishes to assume; the degree of financial disclosure of its world-

wide operations which the investor is prepared to make to the host authorities; and the degree of control which the investor wishes to exercise over its operations in the host country.

Banks and other financial institutions, for example, have often preferred to operate their foreign activities through branches rather than through subsidiaries—and are often required to do so by host governments. The assumption of liability by the parent entity under the branch form may generate more client confidence than would have been the case if the subsidiary form, with liability limited to assets in the host country, had been employed instead.

Tax advantages of the branch form

1. In many countries, including the United States, losses from foreign branch operations are immediately deductible against income generated by the parent on its home country operations. Hence, the branch form of operation will be advantageous to enterprises based in countries which require “accrual” taxation of foreign branches, if losses are expected from foreign activities during the first few years of operation. If its foreign operations subsequently become profitable, the branch may then be incorporated to reap the advantages of tax deferral.⁸⁶

2. Traditionally, branches were only taxed once on their income or profits, so that any after-tax income might be repatriated to a foreign-based parent enterprise free of withholding tax. In this framework, such repatriated income is not considered to be a dividend or interest. (More recently, many developed and developing countries have adopted a supplementary form of taxation on branches known as a *branch profits tax*.) By contrast, the return on capital invested through a subsidiary is usually taxed twice; once at the corporate level and again, when dividends or interest are remitted, with a final withholding tax. If the host country operated an imputation system for the relief of corporate income tax, portfolio shareholders of the subsidiary may or may not receive a credit.

3. Property can often be transferred to a branch without triggering current taxation in the home jurisdiction on asset appreciation. Transfers of such property to foreign subsidiaries often give rise to capital gains taxation on any appreciation.

Tax disadvantages of the branch form

1. A multinational enterprise cannot defer home country taxation on branch income not remitted to the home country, in those jurisdictions which tax resi-

⁸⁵See OECD (1992), pp. M 10–11.

⁸⁶See Leechor and Mintz (1991), p. 104.

dents on their global income. By contrast, a subsidiary has the opportunity to defer taxation in the home tax jurisdiction on income which is not remitted. Before 1986, the deferral opportunity enjoyed on the unremitted income of a foreign subsidiary under the U.S. foreign tax credit system favored employment of the subsidiary form by U.S.-based investors with profitable foreign operations.⁸⁷ Assuming that the host country's corporate tax rate is lower than the home country's, incremental tax in the home country is deferred, which reduces the present value of the enterprise's global tax burden. (This disadvantage to the branch form may no longer be an important consideration for branches operated by U.S.-based parents.) Since the United States' 1986 tax reform, average tax rates on foreign operations are often higher than the U.S. rate, causing the parent company to earn "excess" or not immediately usable foreign tax credits (except in tax havens). Enterprises based in capital-exporting countries which adhere to the *source principle* of international income taxation have made greater use of the branch form for foreign operations because most repatriations from either branches or subsidiaries are not taxable.

2. Host tax jurisdictions often provide less generous treatments for loss carryforward and carrybacks to branches than to subsidiaries. Some jurisdictions make no provision in their tax codes for loss carryovers by branches.

3. Limitations on deductions are often more restrictive for branches than for subsidiaries. Such restrictions are usually inspired by the desire to deter transfer-pricing abuses. For example, Switzerland permits subsidiaries but not branches to deduct management fees paid to a head office.⁸⁸ Such discrimination should be avoided unless the potential for transfer-pricing abuse can be shown to differ across forms of business organizations.

Rationale for a Branch Profits Tax

Many jurisdictions impose a branch profits tax on foreign-based branches to achieve greater neutrality and equity in treatment between branches and subsidiaries and to forestall revenue erosion. Without such a tax, repatriation of branch profits does not give rise to tax liability, unlike the repatriation of dividends by a subsidiary.

A simple branch profits tax at the same or lower rate than the withholding rate on foreign dividends can achieve approximate neutrality between foreign branches and subsidiaries operating in the host country. A lower rate is justified if a branch profits tax is imposed on profits in the year or quarter in which they are earned, whereas the dividend withholding tax is only applied to remittances to shareholders. Countries that impose this form of tax often choose a design which exempts from taxation any income that is reinvested in the branch. This approach has been adopted under the U.S. 1986 Tax Act.

Some experts advocate that the design should not emphasize internal formal harmonization of the tax system at the expense of administrative simplicity.⁸⁹ For example, the Canadian branch profits tax, which seeks to achieve rigorous parity between the taxation of subsidiaries and branches, involves the use of concepts which have no counterpart in standard accounting. Developing countries, looking for pragmatic solutions with greatest simplicity, should be able to achieve approximate parity with a simple surcharge on branch profits. For example, in the case of a 40 percent income or enterprise profits tax and a 20 percent withholding tax on distributed dividends, the total tax liability on a subsidiary's income will be 52 percent, assuming full distribution of income. This example suggests that a 12 percent surcharge on branch profits is appropriate. A somewhat lower surcharge rate is appropriate to recognize the deferral advantage enjoyed by subsidiaries, because such a surcharge would be applied immediately, whereas the withholding tax would apply only upon repatriation; it would also recognize that subsidiaries do not generally repatriate all of their profits.

Instituting a branch profits tax on foreign-based permanent establishments may violate the nondiscrimination provisions of an existing tax treaty. In such cases, current treaties will have to be renegotiated. Introducing such a tax also increases the need to restrict deductible interest disbursements to foreign parties.

Preventing Thin or Hidden Capitalization

Thin or hidden capitalization of a subsidiary arises when a foreign investor responds to tax incentives by substituting foreign debt capital for equity capital financing, particularly in cases where the debt financing exhibits some of the characteristics of equity and the debt is owed to a nonarm's-length lender. While a high debt/equity ratio per se should not be taken as proof

⁸⁷This tax-motivated incentive for U.S.-based foreign investors to adopt the subsidiary form has been lessened by the changes arising from the 1986 U.S. tax reform. See Ault and Bradford (1990).

⁸⁸See Scholes and Wolfson (1992), p. 250.

⁸⁹See Oldman, Rosenbloom, and Youngman (1991), pp. 385-97.

of hidden equity capitalization, a high ratio may indicate efforts to achieve a tax advantage through excessive debt financing. This type of financing enables a foreign-owned subsidiary to reduce its taxable profits by deducting interest payments to nonresident creditors to which only nonresident interest withholding taxes would apply. By contrast, if the profits of a subsidiary are transferred by dividends, such payments will not be deductible in calculating the subsidiary's taxable profits. In addition, to avoid corporate income taxation on what would otherwise be profits, the thin capitalization strategy may enable the parent company to avoid or defer taxation in the home country.

Multinational enterprises can often use thin capitalization techniques in combination with *treaty shopping* to reduce their global tax burden, because of different treaty provisions for withholding taxes on dividends and interest. *Treaty shopping* occurs when a combination of treaty and national tax laws involving more than two countries create a favorable tax regime which can be exploited by residents of nontreaty countries.⁹⁰ For example, interest payments might be routed through one or more holding companies in a series of countries linked by suitable treaties, so that the return on investment can be shifted from the original source country to a country where it will bear little or no tax.

Thin or hidden capitalization tax rules are designed to restrict such behavior. Three general approaches have been adopted by countries to restrict thin capitalization. These are (1) the denial of a deduction for interest expense on any related party loan; (2) general anti-abuse arm's-length approach; and (3) acceptable capital-to-debt ratio approach.

The *denial approach* discriminates in an arbitrary fashion because it penalizes debt between related parties relative to other forms of debt. It also encourages avoidance by disguising related party debt as unrelated debt. Policing such abuse is difficult, particularly for countries with limited administrative resources.

The *anti-abuse approach* seeks to look behind the form of a transaction, in light of all relevant circumstances, to see whether the real nature of the contribution is debt or equity. Each debt transaction must be examined separately to determine whether the terms of the debt instrument are those which would have been entered into by unrelated parties.

Under the *fixed-ratio or capital structure approach*, a fraction of interest paid to foreign creditors is disallowed as a deductible expense when the debt/equity ratio exceeds a specified level. The disallowed portion

of interest is determined by prorating with the excess debt/equity ratio. In measuring the equity portion of a capital structure, most jurisdictions will find it administratively difficult to insist on the annual fair market valuation of corporate equity. Therefore, a feasible alternative is to define equity as the sum of retained earnings at the beginning of the year, contributed surplus and paid-up capital, though this approach will not be appropriate for jurisdictions with high rates of inflation. The fixed-ratio approach may be applied universally or only to transactions between related parties. Oldman, Rosenbloom, and Youngman advocate that thin capitalization restrictions apply not only in cases of potential outright tax evasion but also to bona fide shifts in capital structure which would transform what would otherwise be dividend payments abroad into deductible foreign disbursements.⁹¹ Universal limitation rules should be more effective than rules which permit exemptions and give unnecessary discretion to tax administrators in host countries.

Financial theory and practice suggest that the optimal appropriate ratio of debt to equity varies from industry to industry and from company to company. Countries which employ this approach sometimes provide a higher deductible debt/equity ratio for financial institutions, though this refinement introduces additional administrative complexity.

The ratio approach would appear to be a more appropriate tax instrument for developing countries in combating thin capitalization than the anti-abuse or denial approaches, because of its limited use of tax assessing resources and the lack of administrative discretion.⁹²

Recently, a fourth alternative has been suggested for economies in transition experiencing high rates of inflation. Under this approach, the deduction of interest is *limited to a specific percent of taxable income gross of interest expenses*, rather than being prorated on the debt/equity ratio. To avoid penalizing financial institutions, a variant of this rule would allow all interest incurred to be deducted up to the amount of interest income. The justification for this approach is to prevent both foreign- and domestic-based enterprises from stripping earnings. This approach may be preferable to the ratio approach when accounting equity cannot readily be modified to reflect inflation-induced changes in fair market value.

⁹⁰See Hufbauer (1992), p. 218; and OECD (1987), p. 11.

⁹¹See Oldman, Rosenbloom, and Youngman (1992), p. 395.

⁹²For example, see recommendations on thin capitalization in Oldman, Rosenbloom, and Youngman (1992), pp. 385-98.

Tax Coordination and Harmonization

ANGELO G.A. FARIA

- *What is the recent experience of tax coordination and harmonization in securing the efficient functioning of global trade and capital markets?*

As noted above, the double taxation of foreign-source income by competing tax jurisdictions necessitates unilateral, bilateral, and even multinational schemes of coordination and harmonization with the long-term objective of creating level tax-playing fields for movement of commodities and factors of production and eliminating tax arbitrage of transactions. At a simplistic level, however, it is argued that tax competition through market pressure may be desirable because it brings about spontaneous convergence through downward pressure on taxes, leading to downward pressure on the level of expenditure, greater efficiency in the use of resources by the public sector within countries, and an efficient allocation of the world's capital. On the other hand, tax competition in this sense is purported to also have destabilizing shorter-term macroeconomic spill-over effects, which interfere with the efficient functioning of global trade and capital markets. As previously indicated, the optimal condition for efficiency is a residence-based approach to international taxation by all countries. In practice, however, tax competition occurs through terms-of-trade manipulation among countries arising from the incidence of taxes on the intratemporal terms of trade (the relative price of goods) and the intertemporal terms of trade (the interest rate).⁹³

It is suggested that the three major criteria for interjurisdictional tax coordination are interjurisdictional equity, locational neutrality, and taxpayer equity. According to these principles, source countries have the primary right to tax income earned within their territories, while domicile countries should assume responsibility for achieving local neutrality and taxpayer equity, usually by applying the residence principle to tax foreign source income and allowing foreign tax credits. Interjurisdictional equity is achieved by having full reciprocal uniformity in corporate and withholding tax rates among countries. In practice, however, these clear-cut principles seldom hold, and thus efforts continue to be made at best to avoid beggar-my-neighbor

tax competition through bilateral coordination arrangements.

There is more than a mere semantic difference, particularly in relation to developed and developing countries, between tax coordination (TC) and tax harmonization (TH). From a substantive perspective, TC can be viewed as a process leading up to the ideal TH. TC may, as noted above, be unilateral or cooperative in dimension. It does not imply uniformity of individual taxes between countries, much less uniformity of their tax systems. Indeed, one may strictly view any adaptation of a domicile country's tax system to that of a source country and vice versa as representing TC, if the objective is not to increase the overall tax burden. On the other hand, tax harmonization in some sense presupposes the process of establishing a wider regional economic grouping which may be based on factors other than comparable economic strength such as geographical proximity. Attempts have been made, usually at the regional level, and in the context of established free trade unions or common markets, to move toward TH. Examples include: Central American Common Market (CACM) in 1958, Latin American Free Trade Association (LAFTA) in 1961, Council of Arab Economic Unity (CAEU) in 1961, Central African Customs and Economic Union (UDEAC) in 1964, Andean Subregional Integration Agreement (ASIA) in 1969, Caribbean Community (CARICOM) in 1973, Economic Community of West African States (ECOWAS) in 1975, and Latin American Integration Association (LAIA) in 1980. The most well known of these is, of course, the European Community (EC) established in 1975 and still in progress. More recently, strenuous attempts are being made to establish a North American Free Trade Area (NAFTA).

The experience with regional tax harmonization has been only modestly encouraging. Some success has been recorded in establishing a common external tariff and equalizing interest taxes, against which there has been negligible progress in achieving interjurisdictional equity in taxing appropriate income shares. In the EC, the view remains that tax harmonization should proceed in a stepwise fashion beginning with agreement on the type of tax to be harmonized, followed by harmonization of the tax base, and eventually by harmonization of the tax rates. On this basis, the harmonization process has been restricted to a few

⁹³See Richman (1963).

major taxes: turnover taxes, excise duties, corporation taxes, withholding taxes on dividends and interest, and some capital duties. In this respect, major progress has been made only in harmonizing VAT regimes across member countries, and even this is not fully for tax rates.

In harmonizing taxes, it is suggested that the objective should be to permit intercountry diversity reflecting national preferences, consistent with minimizing the net burden of benefits *and* costs of government intervention. This is a broader view than straightforward tax uniformity because it implies that efforts at tax harmonization or uniformity must also take account of the expenditure side of the budget. Moreover, enough recognition has not been given to the fact that even formal tax harmonization seldom equates with effective tax harmonization because of variable country performance in administering taxes. With the marked increase in multinational trading ventures, some form of tax coordination or selective tax harmonization seems unavoidable to ensure taxpayer equity and neutrality that developed countries find important, as well as greater revenue and investment flows that are the primary concern of developing countries.

Consumption Taxes

In tax relations between developed countries, coordination and even harmonization of consumption taxes has recorded relatively greater success than that of income taxes. This is probably because with such taxes entering into traded goods prices, their distorting effects on trade flows are more immediate and visible, and the search for solutions becomes more urgent. Thus, adaptations—unilaterally in some cases—have been made to import tariffs, export taxes, and VATs based on some evolving consensus of their purpose and the structures of their bases and rates. But troublesome problems of border tax adjustments continue to manifest themselves in this process.

In the VAT area, the general trend to consumption-type, destination-based, and tax-crediting taxes seems well established. It has been recognized that an excess tax burden on tradables is created directly when the nominal tax rate for imports is higher than that on similar domestically produced goods, or when domestic tax incorporated in the export price is not fully rebated at the export stage through prompt border tax adjustments. Within the EC, it has proved easier, in relation to the VAT, to agree on the nature of the tax (consumption type) and the tax base (virtually all domestic consumption of goods and services except financial services) than the tax rate structure (number and levels

of rates, although the 6th Directive has formalized a minimum rate level of 15 percent). Clearly, having the uniformity of a single rate would be desirable, as open national borders within the EC came into effect in 1993 (see the section on VAT, Chapter III).

The movement to regional economic groupings involving a common market with a common external tariff has underlined the changing primary role of the import tariff. With the development of economies and associated tax structures in developing countries, the import tariff is viewed less as a revenue "tax handle" and more as an instrument of effective protection of domestic production. This has increasingly resulted, in such countries, in simplified tariff structures with fewer nominal rates differentiated by degree of industrial processing, and lower average rates. On the export side, while zero rating of industrial exports has generally been accepted, taxation of primary and universal agricultural exports still continues. Particularly in countries that, although producers of a single good, individually have only a small world market share and thus cannot influence world prices. As such, they face difficulty in shifting production-based taxes forward into final export prices.

As one would expect, because of their essentially revenue, country-specific nature, there has been little cross-country harmonization of excise duties even for commonly taxed sumptuary products. Some attempt, however, has been made to harmonize them within countries, through an equivalence or level playing field in the overall tax burden applicable to similar imported and domestically produced goods.

Income Taxes

The harmonization of cross-country income taxes has evoked much analysis because of its implications for global capital flows, business savings, choice of investment and, in developing countries, revenue yield. Particular attention has been focused on the after-tax return to capital, that is, the net return after the combined rate of tax applicable to corporate profits and withholding on capital income, because of its consequences for capital import neutrality.

Considerations of interjurisdictional equity—brought to the fore by the principle that a source country should have a prior tax claim of income arising within its jurisdiction—have raised questions about how its tax base and tax rate should be determined by tax administrations in relation to claims made by competing tax jurisdictions or countries. Ideally, the division of the tax base should be determined through a "separate accounting" approach under which, using

traditional accounting methods and assuming "arm's-length" pricing, the income of, say, multinational trading firms is assigned between the different countries in which operations are carried out through a permanent establishment. Such determinations may, and generally are, at variance with those made by firms themselves. Thus, while recognizing interfirm or intergroup linkages, notably relating to shared overheads and scale economies, the principal difficulty for tax administrations, especially those in developing countries, is how to challenge foreign or multinational firms' manipulation of profits across tax jurisdictions to minimize their tax burdens through transfer-pricing, royalty agreements.

As regards the tax rate applicable to an assigned tax base, in practice, the main difference has related to the treatment of capital profits and capital income arising from the ownership and sales of physical and financial assets. For capital profits, the prevailing practice is one based on the principle of nondiscrimination between profits accruing to nonresidents and those accruing to residents. It has been suggested, however, that the nondiscrimination rule may not be appropriate because the tax rate applicable to nonresident income should be decided more on grounds of interjurisdictional equity, while the rate for resident income should be based more on domestic economic policy and revenue considerations.²⁴ Where considerations of revenue conflict with those of interjurisdictional equity, then a rule of reciprocity is applicable, generally in the frame-

work of bilateral tax treaties. Under this rule, which has earned widespread acceptance, common forms of capital income (e.g., dividends and interest) are made subject to final withholding taxes at similar rates in the source and domicile countries. This attempt to balance reciprocity and interjurisdictional equity has understandably not found much favor with developing countries as source countries because most such income is then repatriated to the domicile country where it can be taxed at a higher corporate rate.

The tax treatment of corporate profits and distributions between a source country and a domicile country is further complicated when they operate the classical system or full/partial integration or imputation schemes. In principle, and based on interjurisdictional equity grounds, the source country is not really involved, so that it ultimately becomes an issue of how much revenue the residence country is residually prepared to trade off permanently or temporarily (through tax deferral) for tax equity or tax neutrality, or both, or even whether it wishes thereby to make explicit provision of a tax preference to investment in the source country. In practice, of course, considerations of revenue gain have to be tempered by implications for foreign investment, for source countries. For domicile countries, the consequences of its tax treatment of CEN remain a major cause for concern. Clearly, compromises relating to these different, perhaps competing, sets of considerations are best secured and sustained through tax harmonization in the form of bilateral double taxation treaties or similar arrangements in wider geographical groupings.

²⁴See Richman (1963).

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VI

SPECIAL TOPICS

Taxation of Mineral and Petroleum Resources

DAVID C.L. NELLOR

- *What factors make taxation of mining and petroleum enterprises different from taxation of other enterprises?*
- *How does the choice of tax instruments influence the development of a country's mineral and petroleum resources?*
- *What are the different types of tax instruments that can be used in the mining and petroleum sector? What is role of each of these instruments?*

Many developing countries and some economies in transition depend heavily on mineral and petroleum extraction for fiscal revenue and foreign exchange. Because these mineral and petroleum projects are often enclave activities with few direct links to the domestic economy, the public sector must be the principal agent for translating resource production into wider economic benefits.

The government has two fiscal roles with respect to the natural resources sector: it is the sovereign tax power and the resource owner. As the sovereign tax power, the government has the responsibility to ensure that the resource sector makes its due contribution to public revenues in the same manner as other industries. As the resource owner, the government must determine when to exploit its natural resources as well as ensure that it gets an appropriate price for its resources and distributes the benefits of resource exploitation so as to promote sustainable economic growth and intergenerational benefits.

Factors Shaping the Choice of Fiscal Instruments

At one level, there is a fundamental conflict between resource companies and the government over the division of the risk and reward of resource development. Both parties want to maximize rewards and shift as much risk as possible to the other party. At another level, resource agreements and the associated fiscal rules are a means of creating an identity of interest between the resource company and the government. The magnitude of revenues to be divided is maximized by designing fiscal arrangements that encourage a stable fiscal environment and efficient resource development.

Most mining and petroleum agreements are written for periods of 10 to 30 years, with the aim of defining a stable relationship between the investors (often multinational companies) and the government. One reason resource projects are developed under long-term agreements is that the balance of power shifts over the life of a project. Before exploration begins or in its early stages, the power is with the resource companies because there is worldwide competition to attract potential investors. The power then shifts to the government, and political pressure for renegotiating the original agreement can become almost irresistible once a successful project has come on stream and is generating significant positive net cash flows. At the tail end of the project, when the resource deposit is almost depleted, the balance of power shifts again. The resource company can walk away from the project should it conclude that the government is making excessive demands.

Given the shifting balance of power over the life of a project, it is difficult to achieve an identity of interests. Further, both the division of the rewards from natural resource exploitation and the relative weights assigned to various fiscal instruments involve political judgment. A unique best policy cannot be proposed—there are unavoidable trade-offs between revenue, risk, and timing of the receipt of revenue. But, it is likely that multiple fiscal instruments will be needed to protect the interests of both parties over the life of the agreement. Product-based instruments can ensure that the government receives at least a minimum payment for the exploitation of natural resources of the country. Profit-based instruments reduce the likelihood of unplanned changes in resource contracts because they mean that the government shares in the returns from projects that turn out to be more profitable than expected.

Fiscal Instruments

This section reviews the instruments available to government both in its role as sovereign tax power and as owner of natural resources.

Sovereign tax power

- *Income taxation.* The income tax is best suited for meeting the objectives of the government's general tax power and should be levied on all resource and

nonresource companies. It would be levied on resource sector companies whether or not the government owned the resources in the ground. Consequently, the decision by some governments to design income tax provisions specific to resource projects—such as accelerated capital deductions—is inappropriate. Rather, specific resource sector issues should be addressed by changing the price the government is charging for the use of its resource wealth. This price is levied by fiscal instruments, such as royalties, that are discussed below.

Similar to income taxation of other industries, income taxation of the resource sector involves matching of income and expenses. Most important, expenditures that produce a benefit over more than one accounting period should be capitalized and written off over their “useful life.” This ensures a rough matching of income with the expenses necessary to produce that income. Depletion of natural resources is simply a special case of capital recovery. Nevertheless, the particular features of the mineral and petroleum sectors mean that some income tax issues are more important than in other industries. Owing to the large initial capital outlays incurred in exploration and development of resource projects, defining capital deductions and the permissible debt equity ratio are important to maintaining the tax base and, in the latter case, to avoiding earnings stripping through artificially high debt-equity ratios.

The involvement of multinational companies increases the likelihood of transfer pricing as does the incentive created by the differential tax treatment of resource and nonresource companies within a country. Countries require provisions in their tax law enabling a price adjustment to be made where under- or overpricing between associates has resulted in a lowering of taxable profit. To enforce such provisions, tax returns, at a minimum, should request details of domestic or international transactions with related parties.

In addition, an income tax is important in sectors, such as resources, in which foreign investment plays an important role. Many countries tax the worldwide income of their companies and allow a foreign tax credit. Investors from these countries—including Japan, the United Kingdom, and the United States—will want an income tax so as to have a creditable tax in their home country.

- *Import duties.* Mineral and petroleum companies should be subject to import duties like other companies. Import duties are an element of the general tax powers of government rather than an instrument to secure a return on resource ownership. Thus, as a gen-

eral rule, the tariffs applied to the resources sector should be those generally applicable in the economy. Resources sector companies rely heavily on imported capital equipment and intermediate inputs for their exploration, development, and operational activities. This makes import duties an important, timely, and relatively stable source of government revenue from the resources sector.

The government as resource owner

The fiscal arrangements with respect to natural resources need to take into account that the government is the landowner or the owner of mineral rights. If a valuable resource is going to be extracted, the government should receive a payment for this resource, separate from the regular income tax. The choice among fiscal instruments hinges on the timing of revenue, ease of administration, and risk-sharing. Hidden costs (or implicit taxes) such as mandated construction of schools, medical clinics, local roads, training, and localization requirements reduce what companies are willing or able to pay in direct taxes.

Traditional efficiency considerations would likely lead to the choice of one fiscal instrument that does not distort investment and production decisions or at least minimizes those distortions. There are, however, broader considerations of efficiency in reality. For example, the impact on investment decisions of the risk that future governments may change contractually agreed upon fiscal rules or even nationalize a mine. It may be in the interests of both parties (and efficiency) to design a combination of fiscal instruments to reduce this possibility.

The fiscal instruments chosen will influence the amount that the investor is willing to pay for the right to extract the resource. An auction of a mining lease, for example, provides revenue immediately, is efficient in a traditional sense, but may yield little revenue if there is a risk that the fiscal rules will be changed once the mining activity has commenced. Thus, the government may be faced with a trade-off if it values both the level of revenue and the receipt of revenues sooner rather than later.

The government also has an intertemporal production decision to make—it must assess whether resources should be exploited today or at some point in the future—this analysis of the opportunity cost of extraction should help it to define the minimum return that it should accept from an investor.

Finally, some governments want to extend the scope of resource taxes downstream to various manufacturing activities, such as refining or liquefaction of gas. At

least conceptually, the analysis of mineral and petroleum taxation based on resource ownership is restricted to taxing the resource at the well or minehead.

- *Lease bonuses.* Lease bonuses are up-front payments that could be determined by auction or at the government's discretion. These payments are generally easy to administer. They mean that the investor bears the risk that the project will not be commercially viable because the return to government is fixed.

Reliance on a lease bonus offers little incentive for future governments to abide by the terms of natural resource lease arrangements. This raises a further element of risk—risk that a subsequent government will change either the fiscal arrangements or nationalize the mine or petroleum project. Thus, even if there was perfect foresight concerning the ex ante profitability of a prospect, an auction for a lease may yield little return to the government.

- *Royalties.* Royalties are levied either on the volume or on the value of resources extracted. Royalties secure revenues as soon as production commences, are considerably easier to administer than most other fiscal instruments, and ensure that a minimum payment is made by the companies for the resources that they extract.

The conventional advice in the literature is to discourage the use of royalties. Proponents of this view note that royalties raise the marginal cost of extracting a resource and this may discourage development of otherwise marginal projects. In projects that do proceed, lower quality ores are left undeveloped. These propositions have been used to justify the use of profit-based fiscal instruments that are viewed as less distorting of investment and production decisions than royalties.

An alternative view is that a royalty is the price for natural resource extraction and, as such, is not necessarily distorting. The royalty, as a price for resource extraction, serves a role in determining whether investment should or should not proceed. The government-owned ore or petroleum should be left in the ground for future development if companies are not prepared to meet this price reflecting the government's opportunity cost of resource extraction. The government should determine what minimum payment it is willing to accept for the resource recognizing that it has given up its capital (i.e., the resource in the ground) once the resource is extracted. There is no reason to provide the resource to companies for nothing—however, under some "neutral" profit-based fiscal arrangements, the government is at risk of receiving little or nothing from resource ownership.

The case for use of royalties is reinforced by the significant administrative and monitoring advantages of royalties over other fiscal instruments. The royalty should be based on a transparent price formula agreed upon as part of the mining or petroleum agreement. Conceptually, the commodity price on which the royalty is based should be the mine or wellhead price, and the maximum royalty that could be imposed is then defined as the difference between the wellhead price and the cost of extraction. In some countries, the price used for determining the royalty is the export f.o.b. price. An overriding concern should be the use of an observable price and this could necessitate using the downstream price. In such cases, the rate of royalty would need to be adjusted in a simple and predictable way to reflect extraction and other intermediate costs. Royalties should be deductible for purposes of determining income tax liability because they are a cost of production.

Royalties can vary across projects depending on government perception of profitability (royalty rates could be auctioned) and higher royalty rates could be triggered by higher commodity prices according to an agreed formula based on transparent market prices for the commodity.

- *Resource rent tax.* A resource rent tax (RRT) is similar to a cash-flow tax but is imposed only if the accumulated cash flow is positive. The net negative cash flow is accumulated at an interest rate that, in theory, is equal to the company's cost of capital or discount rate. An RRT takes a share of returns once this rate of return has been earned by the company.

As envisaged by its designers, the RRT efficiently captures a share of natural-resource rent which is the return over and above the company's cost of capital. Because the RRT only shares in returns in excess of the company's opportunity cost of capital, it does not distort investment and is thus viewed as a superior fiscal instrument to royalties. Another advantage of the RRT is that it cannot incur losses for the government unlike other fiscal instruments, such as cash-flow taxes, or equity which can yield similar returns to the RRT. Further, the RRT may enhance contract stability because it automatically provides additional revenue in highly profitable projects.

Contrary to its theoretical attractiveness, the RRT can discourage exploration in practice. The RRT cannot be neutral with respect to the exploration decision because investors know that they will be taxed on highly successful projects whereas unsuccessful projects will be unaffected. Consequently, the company's expected

return from exploration is reduced by the RRT, and this distorts exploration decisions.

Also, excessive capital investment or a reduced rate of production will be encouraged if the RRT accumulation rate is set above the company's discount rate, which will vary from company to company and can never be known with certainty. For example, assume a company's discount rate is 15 percent and the RRT accumulation rate is 20 percent. Absent the RRT, the company would just be willing to invest 1 million today if it received a payback of 1.15 million a year from now. This investment would not be marginal if the company expects to be subject to the RRT because for RRT purposes, the 1 million outlay this year would be uplifted to 1.2 million next year, giving the company a 0.05 million loss that will reduce RRT taxable income in the future, providing an unintended tax benefit. In fact, if the accumulation rate is set too high, companies will have an incentive to stretch out development of a project.

The RRT is a high-risk measure for the government gaining a return on resource ownership; although revenue could be sizable in favorable circumstances, there is also a significant chance that resource development will yield little revenue. The RRT only provides a return to government on those projects yielding above normal rates of return. It is possible that the project may be seen to be earning high positive net cash flows but yield no revenue, creating political pressure for revision of the resource contract. Further, because the investor receives the threshold return before the government receives any revenue, the revenue stream, if any, is "back-ended."

In summary, the RRT can play a role of capturing rents not collected by royalties and of enhancing contract stability by improving revenue buoyancy in relation to highly profitable projects, but it should not be relied on as the major fiscal instrument from which a return on resource ownership is gained.

- *Government equity.* Government equity in mineral and petroleum projects is an important political symbol in many countries. Government equity gives a sense of participating in the development of the country. Beyond these arguments, however, there is a compelling case for the government not taking an equity interest in mineral and petroleum projects. Nevertheless, should the government decide to take an equity position in mineral and petroleum projects, it should use a carried interest.

There are a number of costs associated with public ownership. First, when the government takes an ownership position, it exposes itself to risk. At the time the government is required to exercise its equity option, it

can never be known with certainty whether it is making a good investment. Though it may appear that a particular project will be highly successful, unexpected events, such as a fall in mineral prices, can turn a promising equity investment into a significant government liability. Second, taxation is more likely to maximize government revenue flow than an equity interest that looks to dividends that may never be paid. Third, equity requires the government to divert funds that otherwise could finance priority development projects. Moreover, a government equity interest could weaken the country's external position. If the government borrows externally to pay for its equity interest, there will be years when the government is required to pay interest on its indebtedness even though it received no dividends from its investment. Fourth, there can be a conflict between the government's role as a shareholder (or joint venturer) and its role as a regulator. As a shareholder, the government will want to maximize its return from its investment. As a regulator, the government will want to ensure that the mining project fully complies with all government regulations.

Fiscal instruments can be designed that yield the government the same return as equity but that are preferable because they eliminate some of the potential costs of equity. An RRT earns the government the same present value return as an equity interest that is purchased for cash, assuming the revenue streams are discounted at the RRT accumulation rate. But, the time profile and risk exposure of paid-up equity and RRT are quite different. With a paid-up equity stake, the government initially incurs substantial negative cash flows—its share of costs—and is subsequently compensated by revenues once production commences. In present value terms, the RRT yields the same revenue. Revenue, however, is only received once the project earns the accumulation rate of return. Should a project be unprofitable, the RRT prevents the government from incurring a loss whereas losses can be incurred when the government holds paid-up equity.

Should the government decide to take an equity interest, it should use a carried interest.¹ This form of gaining equity is less risky than a working interest which requires up-front cash. An RRT, at a 35 percent rate for example, is equivalent to the government having a 35 percent carried interest if the accumulation rate for the RRT is the same as the interest rate charged

¹Under a carried interest, funds are deemed to be loaned to the government by the project investors. Interest is charged on the government's carried interest at a prescribed rate and the loan is repayable out of the government's share of profits from the project. The government's equity interest only crystallizes when the "loan" is paid off. In essence, under a carried interest, government purchases equity by means of a nonrecourse loan provided by the project investors.

for the carried interest. For example, assume the accumulation rate and interest rate are both 20 percent. In the case of the RRT, the government receives nothing until the project earns 20 percent. The government then receives 35 percent of additional profits. In the case of the carried interest, the government receives nothing until the project earns enough for the carried interest to be paid off. If the interest rate on the carry is 20 percent, this will not occur until the project earns 20 percent. Thus, an RRT provides the government all the benefits of a carried interest without the downside of ownership that the government would be exposed to after the carried interest crystallized.

Production sharing can be viewed as another form of government equity. In theory, the government and the private investors are partners. The government contributes capital to the project in the form of the ore body while the private investors contribute the exploration and development costs and operate the project. The government and the private investors agree to share production from the project, though the government often can require the private investors to market its share of the product. Production-sharing arrangements can take many forms and often are quite difficult to monitor and administer as the arrangements are complex and the parties can disagree on just how the arrangement should be interpreted. In a simple production-sharing arrangement, the government and the private investors only share production after the investors have recovered the original exploration costs, development costs, and operating costs in the form of product. A production-sharing agreement along these lines is essentially equivalent to the government having a carried interest, and thus is less risky than a working interest which requires the government to purchase its equity. Some production-sharing agreements limit the cost recovery in any one year to 30 or 40 percent of production, thus ensuring that the government receives some share production when the project first begins to produce.

Conclusion

The fiscal arrangements for resource projects involve political judgments regarding the trade-off be-

tween factors such as revenues, risk, and timing of revenues. A fiscal regime that is less reliant on income taxation and more on royalties will generate a relatively more stable and timely revenue stream. Thus, in many developing countries and economies in transition, the fiscal regime should comprise a broad range of instruments with emphasis on current revenue, lowering government risk exposure, and reducing tax and other administrative burdens. The following issues should be considered in establishing the fiscal regime for mineral and petroleum projects:

- Resource contract stability is likely to be enhanced by use of a variety of fiscal instruments.
- Mining and petroleum projects should be subject to the income tax like other activities in the economy. The various income tax provisions must be designed carefully particularly in relation to capital deductions, permissible debt-equity ratios, and transfer pricing. Transfer pricing is not only a problem at the international level but also domestically because of the different tax treatment of the resource versus nonresource sectors.
- Import duties can play an important role in providing revenue early in the life of a project because of the importance of imported capital equipment. In many countries, capital equipment is often exempt from duties so if revenue is a primary objective, a minimum tariff on capital equipment could be recommended.
- Royalties should play an important role—the rate of the royalty cannot be prescribed as a general rule—but will depend on perceptions of profitability and other aspects of the fiscal package. The rates of royalty may vary across mining leases and they could have stepped rates triggered by higher prices. A transparent price should be used for determining the royalty liability.
- A resource rent tax may be used as one element of the resource sector fiscal regime but should not be relied upon as the major part of the fiscal package.
- If government equity is to be used, consideration should be given to using a carried rather than a working interest.

Taxation of the Financial Sector

JANET STOTSKY

- *What special issues does the financial sector raise under an income tax?*
- *Why are financial services typically exempted from the VAT?*

A well-functioning financial system is critical to a modern economic system. It is essential to directing capital to its best uses and to financing business and consumer activities. Financial institutions encompass a wide range of institutions, including commercial and savings banks, credit unions, insurance companies, pension funds, and brokerages. The taxation of financial institutions is in many respects similar to the taxation of other business sectors; nevertheless, it poses specific problems that require separate consideration. In some developing countries, financial institutions may be secondary to the unorganized financial sector. This sector includes moneylenders, cooperative and trade credit, pawnshops, and other arrangements, and it typically escapes taxation. This chapter first provides an overview of the types of financial institutions in the organized financial sector and the services they provide. It then examines issues relevant to income taxation and consumption taxation of financial institutions. Although financial institutions are also typically subject to a variety of franchise and stamp taxes, these are not discussed in this chapter.

Nature of Services

Financial institutions provide diverse services. They play a critical role in matching lenders and borrowers, by acting as an intermediary between them. Financial institutions generally earn a return on their services by charging a higher interest rate to borrowers than they pay to lenders. By aggregating the savings of many lenders and applying specialized knowledge and managerial skills, financial institutions can create financial securities that vary in several dimensions, including size, maturity, and riskiness. These securities are valuable to lenders and borrowers by satisfying their diverse preferences and needs. Thus, they serve the important role of channeling capital to its best uses and enhancing the efficiency of economic markets. Financial institutions could also play a more limited role by acting as a broker between participants in financial markets rather than by creating financial securities.

Another important function of financial institutions is to offer insurance against a large variety of risks. Insurance companies agree to accept obligations to pay for uncertain losses in return for the payment of fees or premiums. Since the payment of fees and compensation for losses is rarely simultaneous, insurance companies accumulate reserves to meet contingencies. In addition, some kinds of insurance companies, typically those providing life insurance, play an explicit role in saving. Policyholders accumulate money in their insurance policies; insurers invest this money, providing both policyholders with insurance and an explicit financial return on their investments.

Financial institutions also offer a wide variety of financial management services and consulting. Pension funds are an important part of the financial system, with current workers (or their employers) contributing substantial sums to these funds to manage their money and provide them with income in their retirement or in the event that they become disabled. Financial management services encompass a range of specialized services that businesses and individuals need for managing their assets or obtaining credit.

Income Taxation

In principle, the income of financial institutions should be measured the same way as the income of other businesses. Although financial institutions are subject to the usual corporate income tax, their income often receives special treatment in several respects.²

The timing of income

One issue that complicates the measurement of income of financial institutions relates to the timing of income. In general, businesses sell goods and services that involve no future obligation on their part, although, they typically make provisions for costs associated with warranties and bad debts. In contrast, financial institutions typically provide services that have an explicit time dimension. Banks, insurers, financial managers, and pensions provide services that may last over extended periods of time. Accounting for the possibility of future payments as a result of loans, insurance, and other financial activities is thus an integral part of the activities of financial institutions.

²Neubig and Steuerle (1983), and Johnson (1989).

A corporate income tax typically applies to business income as it accrues. There has been vigorous debate over the years whether banks (and other lenders) should be given special deductions for bad debts.³ It is generally agreed that a bank should be allowed to deduct bad debt from income as it accrues. One controversial issue is the question of when bad debts accrue. Another controversial issue is whether the deductions are sufficient to compensate banks for these losses and whether banks deserve special treatment of reserves set aside for bad debts. An example will illustrate the nature of this problem. Consider a bank that makes loans to creditworthy borrowers at a rate of 10 percent. The bank's income is measured as the 10 percent interest minus the costs of servicing the loans. Consider the same bank making loans to less creditworthy borrowers at a rate of 20 percent, with the 10 percent point differential compensating the bank for the greater probability that some of the less creditworthy borrowers will not repay their loans. Even if over some time, the bank would make the same return on its two loan portfolios, the pattern of income on the two portfolios is not likely to be the same since the bank receives more money early on from the riskier portfolio owing to the higher rate of interest. Suppose that in anticipation of expected future defaults, the bank holds some money in reserve for the riskier portfolio. If the bank is taxed on flows of income as they accrue, it only receives a deduction for the bad debt when they actually accrue. As a result, it earns more income initially on the riskier portfolio and hence pays more tax initially on the riskier portfolio. Even though the earnings may ultimately be the same on the two portfolios, in present value terms, the bank has paid more taxes on the riskier portfolio. For the bank to pay the same tax in present value terms on the two portfolios, banks could be allowed a deduction for the bad debt reserve at the time they allocate funds to this use. If the amount set in reserve evens out the flow of income relative to the less risky portfolio, the present value of taxes paid on the two portfolios would be the same, hence the bank would not be penalized for undertaking a riskier investment.

The main argument against allowing banks to deduct reserves for bad debt is that the ability to take these deductions could lead to abuses if banks attempt to shelter an excess amount of income in this fashion by overestimating potential losses, thus deferring income and reducing their taxes in present value terms. Thus, for a deduction for bad debt to be fair, the tax rules must allow a deduction that only evens out the flow of income. In light of the complexity and variety

of loan portfolios a bank is likely to have, there would be many difficulties in administering fairly such a system.

There are two main alternatives under an income tax to allowing banks to take a deduction for bad debts. First, banks could receive no special treatment, taking deductions for bad debts when they are written off. One advantage of this method is that since expected future income is never taxed under an income tax, it offers equity in the treatment of expected future income and losses. Banks might wish to set aside money as reserves, but would receive no preferential tax treatment for this reserve. The main administrative issue in this case is determining when banks should be allowed to write off bad debts, which is a complicated issue. Without clear rules, banks can choose which year to recognize the loss. Second, banks could purchase insurance against bad debts on loans made on new loans. The costs of the insurance would be deductible against income at the time of purchase, thus income would be accurately measured. At the time the losses are realized, the deduction would be offset by insurance payments, resulting in no net tax liability. Similarly, banks could purchase insurance against bad debts on loans that are written off that year.

A similar problem arises with insurance companies since they must also set aside reserves for the purpose of meeting future payments on policies. Often, government regulations set required reserve levels for insurance companies to ensure that they are able to meet their financial obligations. These reserves may not bear an exact relation to the reserves that an insurance company would need to meet its obligations. Often, the reserves are a conservative estimate of insurance company needs.

Tax-favored investments

Income tax laws also provide tax preferences to financial institutions by allowing them to offer certain tax-favored investments that directly benefit investors by reducing their individual income taxes. These tax preferences may take several forms. Financial institutions may be able to offer some investments whose income is completely tax exempt while in other cases, the investment income is only tax deferred. Financial institutions may also be able to offer deposits or bonds whose interest income is tax exempt. Life insurance companies may be able to offer life insurance policies whose cumulative investment income on the death of the policy holder is exempt from inheritance taxes. Financial institutions may also be able to offer retirement savings accounts on which the income is tax deferred until it is withdrawn after retirement. Similarly, insur-

³See Chapter IV for further discussion of this issue.

ance companies may be able to offer life insurance policies on which the investment income, referred to as "inside build-up," is tax deferred. In addition, in some cases, investments may be deducted from taxable income at the time they are undertaken. Depositors in pension funds and other retirement accounts are often able to exclude from tax their contributions to these funds. Often the investment income is not taxed until the income is withdrawn many years later, offering a significant advantage over taxable investments.

These tax preferences encourage investors to purchase tax-favored instruments, at the expense of other investments, which may be more productive. The application of the income tax rules to financial institutions is typically not uniform. Life insurance companies are frequently able to offer tax exempt or deferred investments, while these opportunities are more limited for banks. These tax preferences may thus give certain institutions an advantage in providing certain assets, leading to inefficiencies and inequities.

The intertwined nature of services

One problem arises from the intertwined nature of provision of investment services and other services by financial institutions. Taxpayers typically owe tax on investment income net of costs incurred in earning it while the costs of services not related to investment income are not deductible from income. It may be difficult for a financial institution to separate the two components of costs and hence, it may mix the costs of earning investment income with the costs of other services, leading to an understatement of taxable income. This tax advantage encourages taxpayers to purchase services from financial institutions that also perform investment services. This, however, could be largely a mirage. Thus, for instance, taxpayers may purchase "free" checking services because the cost of servicing the checking account is included in investment costs rather than paid explicitly, even though it is paid implicitly through forgone interest income.

Separating return on capital from return of capital

Another problem arises from the difficulties in separating return on capital from return of capital. At the corporate level, any income that accrues to creditors should not be taxable to the institution. At the individual level, only return on capital should be taxable while return of capital should not be taxable.⁴ The issues are somewhat different between banks and insurance companies. In the case of banks, their income is

the difference between investment income and the costs associated with their operations. A deposit represents a liability to a bank and does not represent income. The withdrawal of a deposit represents a reduction of the liability and hence does not represent a cost. It is thus not that difficult to separate return on capital and return of capital in the case of banks. In the case of insurance companies, their income is derived from premium payments and investment income. Premium payments may represent both a payment for services and a "deposit" for investment. The only taxable part should be the payment for services, since the investment component must be returned. In practice, it may be difficult to separate these two components of premium payments.

A further complication arises when separating return on capital from return of capital, if income is allowed to accumulate without tax. If income is withdrawn from a tax deferred account, then it must either be treated as the investor's return of capital or return on capital. If it is treated as return of capital, then it should be untaxed and if it is treated as return on capital, then it should be taxed. This requires a set of rules which classifies withdrawals as return of or on capital.

Other issues

There are many other issues that arise in the taxation of income of financial institutions, including issues related to income from currency fluctuations or to transfer pricing (see Chapter IV). Since it is often difficult to determine with financial services where the taxable transaction has taken place, apportioning income geographically may also present thorny tax issues. These issues also arise in the context of general corporate taxation.⁵

Consumption Taxation

There are several different commonly used consumption taxes. A widely applied consumption tax today is the value-added tax (VAT). The treatment of financial institutions under a VAT is a difficult issue.⁶ This discussion focuses on the treatment of financial institutions under a consumption-type VAT based on the invoice method and destination principle, since this is the most common form of VAT. Under a well-designed tax system, a VAT would apply to all forms of consumption, including financial services. It is, however, difficult in practice to apply a VAT to financial services primarily because of the difficulty in measuring value added associated with financial services.

⁴Return on capital refers to the income earned from a capital investment, while return of capital refers to the return of the original investment.

⁵See Zins (1988).

⁶See Tait (1988) and Gillis (1990).

Banks

In principle, it is possible to measure value added in the banking sector by adding profits, wages, rent, and interest or, alternatively, by taking the difference between investment income and the cost of funds (interest expense plus the cost of equity financing) and other costs of the bank. The application of the invoice system, however, requires that the VAT liability be attributed to each transaction. This is not possible in the banking sector because most financial services provided by banks do not have specific charges attached to them. Instead, charges for services result from differences in interest rates charged to borrowers and those paid to lenders. Even charges for some services, such as checking account activities, that could be separated from financial intermediation activities are often reflected in interest rates.

Insurance companies

With respect to insurance companies that provide casualty insurance (and other forms of noninvestment insurance), value added is measured by the loading charge, essentially the earnings of the insurer over and above payments of claims. Value added is not properly measured by the value of premiums or claims, since this includes the component of premiums that is a redistribution from one policyholder to another (e.g., when one policyholder makes a claim, there is a redistribution to that policyholder from other policyholders). For insurance with an investment component, the value added is again only properly measured by the loading charge, not the savings component. In either case, it is difficult to measure the loading charge, making it difficult to apply VAT to insurance activities.

Methods of taxing financial institutions under a VAT

There are three obvious ways of including financial institutions in a VAT. These institutions could be exempted, they could be zero-rated, or they could be made fully liable to VAT. Most countries with an invoice method VAT have chosen to exempt financial institutions. The advantage of exemption is that many financial services are provided to businesses that are taxable under a VAT, ensuring that these services are taxed, in effect, even if financial institutions are not subject to VAT. Since exemption does not allow firms to credit VAT paid on inputs, however, some cascading occurs with respect to financial services provided to businesses that are taxable under a VAT. Exemption does allow services provided to households and businesses that are not taxable under a VAT to escape tax, although the inability to credit VAT paid on inputs results in some VAT burden. Exemption puts domestic financial institutions at a disadvantage relative to offshore

institutions, if exports of financial services are zero-rated. Exemption may also encourage financial institutions to produce some intermediate goods themselves, rather than purchasing them, since they could not credit VAT on these purchases. Finally, if financial institutions are only partially exempt, this creates problems apportioning VAT paid on inputs to taxable and non-taxable items and could make the tax more vulnerable to tax evasion schemes.

The advantage of zero-rating is that it avoids many of the problems with exemption, but it has the disadvantage of generating less revenue and lowering the tax burden on financial services compared with other consumption activities.

The advantage of incorporating financial institutions into a VAT is that it enhances the tax base quite considerably and also results in an equal treatment of financial services and other business services. Nevertheless, taxing insurance poses additional administrative and conceptual problems in determining what proportion of insurance services provided to households is consumption and what proportion is investment.

Practice

Table VI.1 summarizes the treatment of financial services under a VAT in OECD countries. All OECD countries exempt the intermediary functions of banks from VAT although a majority of them apply VAT to certain other activities, including check printing, rental of safe-deposit boxes, and foreign exchange transactions. All OECD countries exempt life insurance services fully from VAT while most countries also exempt fire and general insurance services. Finland and New Zealand subject these types of insurance to the standard VAT. Although financial services are typically exempted from VAT, exports of financial services are often zero-rated to prevent a loss of international competitiveness. Other consumption taxes typically apply to certain financial services.

Israel has been the only country to attempt to apply a VAT to a comprehensive base of financial services using an addition-type VAT. Its VAT was applied to the sum of payroll and profits of financial institutions. The tax did not allow an offset for VAT paid by financial institutions on their purchases nor did it allow purchasers of financial services to credit the VAT against the VAT due on their sales. This form of VAT on financial institutions proved to be very unpopular and was dropped. It was replaced with a separate consumption tax applied to the same base.

Developing countries that have adopted a similar form of VAT to the OECD countries have also typically

Table VI.1. VAT Treatment of Financial Services in OECD Countries

(January 1987)

Country	"Core" Financial Services ¹	"Secondary" Financial Services ²	Exported Financial Services	Life Insurance	Fire and General Insurance	Brokers' and Agents' Services	Exported Insurance Services	Other Indirect Tax
Austria	Exempt	Standard rate	Zero rate	Exempt	Exempt	Exempt	Zero rate	Yes
Belgium	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
Denmark	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes ⁸
Finland	Exempt	Exempt	Exempt	Exempt	Standard rate ⁷	Exempt	Exempt	No
France	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
Germany	Exempt ⁴	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
Greece	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
Ireland	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
Italy	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	No
Luxembourg	Exempt	Standard rate ⁵	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes ⁶
Netherlands	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
New Zealand	Exempt	Standard rate	Zero rate	Exempt	Standard rate	Standard rate ⁹	Zero rate	No
Norway	Exempt	Exempt	Zero rate	Exempt	Exempt	Exempt	Zero rate	No
Portugal	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	Yes
Spain	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	No
Sweden	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt	No
Turkey	Exempt	Standard rate	Exempt	Exempt	Exempt	Exempt	Exempt	Yes
United Kingdom	Exempt	Standard rate	Zero rate ³	Exempt	Exempt	Exempt	Zero rate ³	No

Source: This table is taken from Table 13.11 of Messere (1993).

¹Generally includes dealings in money, shares, stocks, bonds, or other securities, lending money or advancing credit (or the arranging thereof), and the operation of any current, deposit, or savings accounts.

²Financial advice, safe-deposit boxes, debt collection, and the keeping of securities.

³Only if exported outside the European Community (EC).

⁴Supplier can choose to have such services taxed where they are supplied to a trader for use in his business. The exemption also applies to the management of credit and credit guarantees, and the management and safekeeping of securities.

⁵Safekeeping of securities is, however, exempt.

⁶Applies only to insurance on boats.

⁷Does not apply to credit and reinsurance.

⁸Fire insurance only.

⁹Life insurance brokers and agents are exempt.

exempted financial services from the VAT. A number of developing countries, however, use selective consumption taxes on particular activities, such as insurance

premiums, which still raises the issue of separating consumption from investment components.

Intergovernmental Fiscal Relations

JOHN NORREGAARD

- *Which are the main principles guiding decentralization of the public sector?*
- *How can subnational governments best be financed?*
- *What is the role of grant and equalization schemes?*
- *Will decentralization pose a problem for macroeconomic control and stabilization?*

The question of how to design an efficient fiscal system of multilevel government is of substantial importance in most countries. Although some basic principles, guidelines and criteria may be established, however, no ideal system exists as witnessed by the immense variety of multilevel governmental systems actually in operation in different countries.⁷

This section summarizes in a nontechnical way the core issues which arise when a country is about to reform or review the existing or to establish a new fiscal system of several tiers of government. In accordance with the basic nature of this issue, the emphasis is on structural problems, although macroeconomic aspects are also touched upon. The scope of this chapter is broad and encompasses mainly normative issues such as expenditure assignments, criteria for what constitutes a good local tax, and the need for and design of grants and equalization systems. This section is to emphasize the basic thesis that the tax issues involved must necessarily be seen in the context of broader structural issues if the resulting tax system is to work efficiently. Being of a structural nature, reforms of intergovernmental fiscal relations must necessarily be implemented with a medium- to long-term time horizon. It is acknowledged that many countries, in particular economies in transition, have serious short-term economic stabilization problems, the solution of which must precede the types of structural reforms dealt with here.

This section encompasses the design of intergovernmental fiscal relations in federal as well as in unitary countries. The section focuses on the general issues that are common to the two constitutional regimes, disregarding problems of design and implementation

which are specific to federal countries. Issues of supranational fiscal relations are excluded (such as convergence criteria and tax harmonization within the EU). The treatment here also excludes issues and policies related to development problems aiming at helping underdeveloped regions, not because these policies are not important, but because they are of a different nature from issues of intergovernmental fiscal relations.

The Rationale for Decentralization

Following the Tiebout/Musgrave tradition, the basic economic rationale for decentralization is the potential efficiency gain which follows from the possible differentiation of the provision of public goods and services in different locations in accordance with the tastes of the local population. Thus, through decentralization, a "market" is established for local public goods, which—by forcing consumers to reveal their preferences (by "voting with their feet")—entails a welfare gain compared to a situation with only one homogeneous level of services throughout the economy. This outcome, of course, assumes that the cost of providing the services can be internalized and thus fully borne by the receivers of the benefits: in accordance with the so-called decentralization theorem advanced by Oates (1972), each public service should be provided by the jurisdiction having control over the minimum geographic area that would internalize the costs and benefits of such provision.

Basically, this mechanism is based on three propositions: (a) that the benefits of decentralized public goods are spatially limited; (b) that consumer preferences vary across individuals as regards private versus public goods as well as for different types of public goods; and (c) that consumers are mobile and, in fact, respond to what has become known as fiscal localization factors such as differences in local service levels and tax rates.⁸ To the extent that this is not the case, the fundamental economic efficiency rationale for decentralization disappears.

It has also been held that—even in cases where the economic conditions for decentralization may not be evident—it will promote local democracy and thereby

⁷For a general treatment of the main principles involved, see King (1984), Musgrave (1983), and Oates (1972 and 1990).

⁸Which seems to be supported empirically in the sense that, in some countries, these factors have been shown to be reflected in property values.

contribute to democratization of society. Finally, decentralization has been held to enhance macroeconomic performance by reducing growth of public expenditures and by mobilizing local financial resources, although—generally—evidence about the correlation between the degree of decentralization and the growth rate of public expenditure is mixed.⁹

The Functions of Lower Levels of Governments

From this general starting point, the first question that arises is what kind of tasks should be assigned to subordinate levels of governments ("local governments" in what follows) and which should be retained at the central level. The answer is closely related to the fact that regions and localities typically are very open economies.¹⁰ Therefore, following Musgrave's classification of public tasks:

- Distributional policies should be assigned only to the central government because people bearing the burden of distributional policies might migrate and thus render local distributional policies inefficient;
- Likewise, local stabilization policies will be inefficient because of spillover effects and because local governments typically do not possess the necessary arsenal of policy measures (e.g., monetary policy instruments);
- The allocative function should be the core function of local governments, that is, their prime task is to provide public goods and services to the local population in accordance with the preferences of this population and with the financing burden as far as possible internalized and thus borne by the beneficiaries of the services (although, of course, a number of important allocative functions owing to their "nonlocal" nature will remain with the central government).

According to this very schematic picture, one of the main guiding criteria for the design of multilevel fiscal systems has been expressed by the term *accountability* which is to be interpreted in a much broader sense than usual (i.e., that local politicians should be held responsible for their decisions to local constituencies), namely that local governments should provide services, the benefits of which accrue to the local population which should also bear the major part of the

economic burden associated with the provision of the services.

Looking at actual policies, however, it is evident that countries for varying reasons in practice assign tasks to lower levels of government which clearly have distributional- or stabilization-related objectives or both. This may in part be to exploit local expertise on, for example, local labor markets, but partly because in practice, it may be extremely difficult to distinguish between tasks which are clearly of an allocative nature and those which are not. Also, in some countries, central governments have "pushed downwards" stabilization measures in order to relieve financial pressures on the central government.

Closely linked to this discussion is the crucial question of how the different tasks of lower levels of governments—once identified and defined—should be assigned to *different* lower levels of government. This is probably one of the key issues in the policy discussion on this topic in most countries, and it also constitutes an area where lack of a clearly defined and communicated policy has led to inefficient systems in a number of countries. In other words, it is extremely important that the assignment of tasks to different levels of government is very carefully thought out, and once the allocation of tasks has been decided upon, that it be kept as stable as possible.

Following the principle of benefit areas indicated above, the theory of local finance "predicts" an optimal structure of local governments which consists of a multitude of layers with different "localities" corresponding to the different services provided. This model of "organized chaos" is seen by some as the actual situation in the United States. Again, this is an area where different solutions have been chosen by different countries, with perhaps the U.S. situation as the one extreme and with a much more rigid or "purist" approach with very clearly defined levels and allocation of tasks chosen, for example, by the Scandinavian countries. The French system with voluntary cooperation between a number of local governments in specific areas may be seen as an intermediate solution. The question of the optimal structure of lower levels of government raises many and very complex problems; among these problems are the optimal size of local governments, the number of levels of government, and the flexibility of the system with respect to borders and cooperation between entities at equal and different levels. Although literature has something to say about some of these issues, it is fairly safe to state that, in practice, the outcome is very much influenced by historical factors and current administrative procedures and capabilities.

⁹It could be added that macroeconomic performance is influenced at least as much by the quality of public expenditures as by its overall level.

¹⁰Disregarding states or provinces in very large federal countries such as Canada and the United States.

Again, it is characteristic that different countries have chosen very different solutions, but experience strongly suggests that it is important to get the basic structure right, and that, once it is chosen, it may be difficult to change.

Financing of Lower Levels of Government

One of the reasons why the importance of structural issues has been emphasized so strongly is that, however efficient and well thought out is the financing system, it can never overcome systemic flaws in the basic structure of the different tiers of government.

Once these basic structural issues have been decided upon, the question of how to design an efficient financing system arises, including the question of the role of taxation. The guiding principle of accountability heavily supported by practical experience suggests that a prerequisite for an effectively functioning system of local government finance is that local governments be given at least one substantial revenue source over which they can decide and the burden of which cannot be exported to taxpayers outside the locality. In addition, the structure of financial sources has to be chosen. The general fiscal policy issues in this regard are (a) what should be the predominant source or sources of finance for local governments over which they can decide; (b) should they be able to decide on the tax base as well as on rates; (c) what should be the relative weight of other sources of finance; and (d) what should be the weight of central government grants and borrowing.

In most countries, lower levels of government have access to four main types of finance, namely, user charges, taxes, grants, and borrowing. There are many theoretical, conceptual, and practical problems related to the use of user charges as well as to borrowing. Most observers, however, seem to agree that user charges should be used wherever possible, that is, when local government provides marketable services, and that the charges should reflect current costs and the use of capital. As far as borrowing is concerned, most countries regulate heavily the use of this source of finance, which is typically allowed only for the financing of local government investment (and in many cases, only for specific purposes), in order to prevent fiscal indiscipline at the local level, and to reduce pressures on capital markets.

The principle of accountability is particularly difficult to apply in practical policies with regard to taxation and grant finance. The following observations are, therefore,

focused on these areas. At the outset, it should be emphasized that taxation and grant-and-equalization systems necessarily must be seen as interrelated: without efficient equalization measures, even a well-designed tax system will not be able to achieve the objective of maximum accountability. There is almost universal agreement that local government taxes as far as possible should satisfy the same requirements as taxes in general, particularly the following requirements:

- Local taxes should—for a given level of revenue—be as neutral as possible and interfere as little as possible with the behavior of consumers and producers.
- They should be easy to administer.
- They should provide local governments with sufficient and stable revenue, given other available sources of finance.
- They should be perceived as fair.
- Finally, they should be as transparent as possible.

This last point is perhaps of special importance for local taxes, and touches upon the following additional criterion which is particular to local taxes:

- Local taxes should as far as possible be internalized, that is, be borne by the local population to which the benefits of the services provided accrue.

A good local tax, that is, a tax which among other criteria satisfies the accountability criteria, is one where local governments are not able to export the tax burden to the citizens of other localities and where the tax base is the least mobile. There is a consensus in the literature that land and property taxes are better than other taxes to satisfy these ideal requirements, though many local government experts also recommend local income taxes as a necessary or possible revenue raiser which to a sufficient degree satisfies the requirements for a good local tax. There is some disagreement as to the extent to which local governments should be allowed to make use of taxes on mobile factors/mobile tax bases, such as capital income taxes (e.g., corporate profits taxes) and consumption taxes (such as the VAT).¹¹ This discussion coincides with the parallel discussion on the potential existence of beneficial impacts of tax competition between localities or regions and the need for tax harmonization, an issue which is not yet finally resolved.

¹¹Again, it must be emphasized that countries have chosen very different solutions with respect to tax assignment to different levels of government. Thus, a large number of countries have assigned profits taxes and/or consumption taxes to subordinate levels of government—either exclusively or under tax-sharing arrangements.

Table VI. 2. The Percentage Allocation of Tax Revenue Between Different Levels of Government

Tax Revenue in Percentage of Corresponding General Government Tax																	
Year	Total Tax as Percentage of GDP	Total tax			Income tax			Property tax			Domestic taxes on goods and services			Other taxes			
		Central government	State government	Local government	Central government	State government	Local government	Central government	State government	Local government	Central government	State government	Local government	Central government	State government	Local government	
Industrial Countries																	
Federal																	
Australia	1991	30.6	79.7	16.9	3.5	100.0	0.0	0.0	2.4	57.8	39.8	72.5	27.5	0.0	45.2	54.8	0.0
Canada	1989	34.9	50.9	40.2	8.9	63.5	36.5	0.0	0.0	16.2	83.8	40.1	59.4	0.4	60.0	32.4	7.6
Germany ¹	1991	41.4	73.4	19.7	6.9	39.1	40.8	20.1	2.0	61.2	36.8	79.1	20.8	0.1	100.0	0.0	0.0
Spain	1990	34.0	87.0	4.8	8.2	92.9	1.2	6.0	5.8	50.5	43.7	81.1	5.7	13.2	99.2	0.0	0.8
United States	1991	27.7	65.8	20.5	13.8	81.1	17.1	1.7	6.0	6.7	87.3	16.0	68.3	15.7	97.8	2.2	0.0
Unitary																	
Belgium ¹	1990	45.6	95.6	na	4.4	90.9	na	9.1	100.0	na	0.0	97.0	na	3.0	99.1	na	0.9
France ¹	1991	43.1	90.5	na	9.5	100.0	na	0.0	100.0	na	0.0	100.0	na	0.0	81.9	na	18.1
Netherlands ¹	1991	48.5	97.3	na	2.7	100.0	na	0.0	65.1	na	34.9	100.0	na	0.0	96.3	na	3.7
Norway	1990	45.2	78.8	na	21.2	47.6	na	52.4	37.9	na	62.1	99.6	na	0.4	97.5	na	2.5
Sweden	1991	54.2	69.6	na	30.4	24.7	na	75.3	100.0	na	0.0	100.0	na	0.0	100.0	na	0.0
United Kingdom ¹	1991	35.8	96.0	na	4.0	100.0	na	0.0	99.2	na	0.8	100.0	na	0.0	81.6	na	18.4
Federal																	
India ²	1990	16.5	65.8	34.2	0.0	100.0	0.0	0.0	33.7	66.3	0.0	49.2	50.8	0.0	88.9	11.1	0.0
Argentina ²	1989	14.6	60.4	39.6	0.0	34.2	65.8	0.0	49.2	50.8	0.0	85.8	14.2	0.0	61.0	39.0	0.0
Brazil	1991	24.5	65.0	30.9	4.1	100.0	0.0	0.0	2.2	40.5	57.3	37.9	57.8	4.3	94.2	5.3	0.5
Mexico	1987	17.8	85.5	11.6	2.9	98.2	1.3	0.6	1.2	0.0	98.8	99.8	0.1	0.1	5.8	77.0	17.2
Unitary																	
Hungary	1990	48.6	92.4	na	7.6	71.9	na	28.1	100.0	na	0.0	100.0	na	0.0	100.0	na	0.0
Poland	1988	44.6	78.7	na	21.3	75.9	na	24.1	48.3	na	51.7	85.8	na	14.2	78.5	na	21.5
Israel	1990	34.7	93.1	na	6.9	100.0	na	0.0	12.3	na	87.7	100.0	na	0.0	98.3	na	1.7
Thailand	1990	19.7	95.6	na	4.4	100.0	na	0.0	81.9	na	18.1	92.1	na	7.9	100.0	na	0.0
Chile	1988	20.5	96.2	na	3.8	100.0	na	0.0	19.7	na	80.3	96.5	na	3.5	100.0	na	0.0
Kenya	1991	23.3	98.3	na	1.7	100.0	na	0.0	0.0	na	100.0	99.5	na	0.5	100.0	na	0.0
South Africa	1990	27.4	94.5	1.2	4.3	100.0	na	0.0	25.5	na	74.5	96.7	3.3	0.0	100.0	na	0.0
Zimbabwe	1986	31.3	96.4	na	3.6	100.0	na	0.0	11.5	na	88.5	98.2	na	1.8	98.7	na	1.3

Source: IMF, *Government Finance Statistics*.

Note: na means not applicable.

¹Includes supranational authorities share of general government total tax revenue for Belgium (1.5 percent), France (0.7 percent), Germany (0.9 percent), the Netherlands (1.4 percent), and the United Kingdom (1.2 percent).

²Data for general government do not include local government.

To illustrate the very different tax structures chosen by different countries, Table VI.2 provides for selected developed and developing countries information about the allocation of the main taxes between different levels of government.

As regards the question of whether local governments should be allowed to determine the base as well as the tax rates, the general principles outlined at the outset seem to entail that only the tax rates should be allowed as policy parameters. The main argument for this limitation is that determining the base involves distributional considerations and consequences, but also that differences in the base across localities and regions would reduce transparency and thus accountability.¹²

Looking at actual tax structures in different countries, it is—once again—striking how different are the policies that countries have chosen. Some countries follow the Anglo-Saxon tradition of heavy reliance on property taxation, whereas other countries (e.g., the Scandinavian countries) use a spectrum of different taxes, but with heavy reliance on local income taxes. A general experience seems to be that property taxes, although they constitute an important revenue raiser, cannot be expected to raise more than approximately 10 percent of total revenue; that is, in countries with heavy or sole reliance on this tax source, central government grants typically play a substantial role.

In many countries, the revenue accruing from property taxes has been decreasing as a percentage of total revenues. One of the explanations put forward for this development is the unpopularity of the tax owing to its visibility and because it is hard to avoid—that is exactly the reason why it is considered to be a good local tax. Also, heavier reliance on property taxes might involve very high and thus distortive tax rates. Another important reason for its decreasing revenue importance is the perception of it being an unfair tax because, in many countries, the system of property evaluation is strongly deficient. This includes long lags in value updates, implying the need of relatively high tax rates to raise a given amount of revenue, and with haphazardous consequences for the distribution of the tax burden and for effective tax rates across taxpayers. This emphasizes the particular importance of a precise measurement of the tax base associated with this tax source. It goes without saying that these problems of valuation may be particularly complex in developing countries and in economies in transition in which well-functioning free markets for property may be limited. In such cases,

¹²Again, in practice, many countries allow some discretion of subordinate levels of government over the tax base, particularly for the provinces or states in larger federal countries (such as Australia).

simpler systems must be applied (e.g., different forms of square meter taxes).

In any case, in designing a local tax system, governments will have to make difficult choices concerning tax base(s), reliefs, exemptions, rates, etc. Practical experience suggests that the following important tax policy issues may arise: (a) to the extent that local governments should rely on local property taxes, to what extent should reliefs be provided for specific groups of taxpayers or specific sectors? (b) how can the tax base be measured in cases where no market prices exist? (c) to the extent that income taxes are preferred, to what extent should the base differ from that used by the central government? (d) to what extent should piggybacking be applied? (e) to what extent should local government taxes be based on tax-sharing arrangements with central government? and (f) should local governments be given any influence on the determination of the tax share accruing to local governments?

Again, a wide variety of systems are applied in practice with respect to the use of different tax sources, differences in tax bases for the same type of taxes across levels of governments, and with respect to the degree to which tax-sharing arrangements are applied.

Tax Sharing and Grant Financing

On the question of tax sharing, the guidelines provided by the general principles outlined at the outset, in particular the principle of accountability, are in many respects similar to those guiding the use of government grants and are, therefore, dealt with together here (generally, these revenue sources represent lump-sum revenues on which local governments have no or only modest influence). In most OECD countries, the trend (or at least the political intentions) in recent decades has been to reduce the overall levels of grants to lower levels of governments and to convert remaining grants from specific to general grants, partly to improve local accountability and incentive structures, partly to improve central government finances.

Grants may be given for a variety of reasons, but generally they are provided for the following:

- To correct for vertical imbalances resulting from the assignment of expenditures and other revenue sources.
- To ensure that all local governments are able to provide a minimum of service, in general or in particular areas.
- To induce local governments to expand services in particular areas which are seen as beneficial by the

central government (i.e., to correct for positive externalities, or to induce the provision of merit goods).

- To overcome lack of sufficient local revenue capacities (i.e., to correct for an insufficient local financing system), either in general or for underdeveloped or poor regions.

- To correct for unequal economic conditions in different localities or regions—or horizontal imbalances—due to differences in objective expenditure needs and fiscal capacities (normally referred to as equalization).

- To ensure a minimum level of redistribution in the system of taxation as a whole by raising more revenue via progressive central government taxes as opposed to the generally more proportional regional or local taxes.

Using the principle of accountability, two general statements may be made: first, unless grants clearly correct for externalities, their amounts should be minimized, and a correspondingly larger role be attributed to local governments' own finance¹³ (which, in addition to the increased efficiency gain, may entail an improvement in the general government budgetary situation); second, a basic prerequisite for an efficiently working local income and/or property tax is that a minimum of equalization with respect to differences in expenditure needs and fiscal capabilities (e.g., as measured by the income tax base per capita) is taking place: the objective of equalization grants should be to ensure that each local government has the capacity to provide a standard level of service if it makes the same effort to raise revenue from its own sources and conducts its affairs with average efficiency. If this principle is followed, differences in average tax rates across localities should reflect differences in the politically determined service levels chosen by the individual governments concerned, and not external factors such as differences in the underlying cost of providing services arising out of, say, the age composition of the population, or differences in revenue capacities arising out of, for example, differences in the average levels of income in different local government regions.

Thus, to ensure accountability, the tax system in its interaction with the equalization system should as far as possible ensure that what might be called the "tax/service ratios" across localities are equal. It is, in this context, important to note that this criterion does not imply

¹³Assuming that any resulting vertical gaps can be closed by higher local revenue sources. Against this change, it has been held that good candidates for local taxes (i.e., taxes on immobile resources) may be undesirable for equity or neutrality reasons.

that tax rates should be equalized; it only implies that observed variations in tax rates reflect as closely as possible variations in service levels politically determined by local governments. Only if this is achieved will the efficiency gains of decentralization be fully realized, and only in this situation will local governments within a country be given reasonably equal opportunities, thereby enhancing the working of local democracy.

Also in this area, there is considerable variation across countries, some countries using only a minimum of equalization, typically achieved by fairly rough measures (e.g., per capita grants), whereas other countries apply sophisticated schemes including tax and expenditure needs equalization, with objective expenditure needs measured by econometric and other statistical methods.

Control of Local Government Expenditure

Looking at actual day-to-day policies toward subnational governments in, for example, most OECD countries as well as in many developing countries and countries in transition (such as China, Brazil, and the Russian Federation), it seems that the question of how to ensure—as an element of current stabilization policies—that aggregate expenditure levels of local governments are in conformity with macroeconomic policy objectives is a basic one. This issue is also a major source of disagreement between local and central governments.

Central governments may want to control local government expenditure first of all because of the important size of these expenditures in total domestic demand (in some countries, public consumption of lower levels of government is larger than that of the central government). Control instruments may take on many different forms, and may be enacted on the expenditure side (e.g., agreed or legislated growth ceilings) or on the revenue side (e.g., rate capping, tax rate ceilings). Second, as referred to earlier, most central governments control borrowing by lower levels of government which—in combination with limited revenue sources—force on local governments an indirect control of expenditures.

There are two schools of thought on this issue: one in favor of central government active intervention, the other against. The main argument against intervention is that, assuming that the system of local government finance is designed in accordance with the general principles described above, as given by the criterion of accountability, local governments will be "self-polic-

ing" in the sense that only expenditures demanded by local voters (and financed mainly by the same local populations) will be agreed upon, and intervention will therefore imply a loss of efficiency and welfare. In Musgrave's terms, stabilization policies should be enacted on the basis of measures neutral with respect to allocation such as central government income taxes, and should not interfere with the (allocation) functions performed by local governments.

There seems to be some (albeit very limited) empirical evidence indicating that the stronger local governments and local democracy, and the more decentralized and self-financing the public sector, the slower the growth of public expenditures.¹⁴ In addi-

¹⁴Generally, however, available empirical analyses have not provided a clear answer to this question.

tion, in some countries (e.g., in Poland), decentralization of revenue and expenditure functions may be seen as an important way, on the one hand, to mobilize local financial resources, and on the other hand, to improve the budgetary position of central governments.

The main argument of the interventionist school seems to be that, generally, "self-policing" does not work, and that due to the relatively limited time horizon of local politicians and the existence of strong local interest groups, expenditure growth of local governments must necessarily be checked. These kinds of policies often go hand-in-hand with exporting of expenditure and revenue burdens from the central to local levels.

Also on this issue, a tremendous variation is observed in policy objectives and in the design of policy instruments across countries and over time.

Alternative Methods of Revenue Forecasting and Estimating

JOHN R. KING

- *What purposes are revenue forecasts and revenue estimates designed to serve?*
- *What methodologies are available for forecasting revenues from different taxes?*
- *How is the process of estimating the revenue effects of possible changes to the tax system related to revenue forecasting?*

The Purposes of Revenue Forecasting and Estimating

Forecasts of government revenues from different taxes and nontax revenue sources are produced for a variety of purposes.

By far, the most important of these is government budgeting. In conjunction with expenditure estimates for the period covered by the budget, a forecast of total revenues is needed to indicate the prospective deficit that will have to be financed. Since the deficit is the difference between two much larger totals, accuracy in forecasting those totals is clearly of central importance: an error in one of them, other things being equal, will result in a much bigger proportional error in the forecast of the overall deficit or surplus.

It may be even more important, however, that the aggregate revenue forecast and the expenditure estimates be *consistent* with one another. For example, if both expenditures and revenues vary in rough proportion to changes in prices or wages in the economy during the budget period, errors in forecasting the underlying growth in wages and prices may have a relatively small effect on the deficit forecast—provided that both revenue and expenditure forecasts are based on the same assumptions. Similarly, errors in forecasting revenues from particular taxes may be relatively unimportant so long as those errors tend to offset one another, since it is the total from all sources that is most important in the budgeting context.

Closely related to their role in budget preparation is the use of tax revenue forecasts in monitoring budget outturns. To serve this purpose, revenue forecasts made at the time of the budget may be revised at several points during the budget period. In addition, Ministries of Finance often find it helpful to set operational reve-

nue collection targets for the tax administration, based on forecasts of revenues from different taxes; and the central tax administration may set operational targets for local tax offices in a similar way.

"Revenue estimating" is the process of assessing the impact on revenues of tax law changes proposed at the time of the budget, or subsequently.¹⁵ It is a process closely related to revenue forecasting, but sufficiently different that in some countries (including the United States), it may be performed by different people. Forecasts are required even when no change to the law is proposed; on the other hand, revenue estimates must often be made for proposals that are not subsequently adopted, and that therefore do not need to be taken into account in any revenue forecasts.

Revenue-Forecasting Methodologies

This section summarizes a number of different methodologies for revenue forecasting that are used in practice, in different contexts.¹⁶ A fundamental distinction is between revenue forecasts that are *conditional* on forecasts of other economic variables such as GDP, and those that are made unconditionally.

Extrapolation

The most straightforward method of making an unconditional forecast of revenues from a particular tax is simply to extrapolate an established linear trend in receipts. More complex procedures using this general approach include the Box-Jenkins ARIMA procedure. When "univariate" procedures of this kind are used to derive a forecast of revenues from a particular tax i , in a particular period t , the revenue forecast T_t^i depends only on revenues observed in the past:

$$T_t^i = f(T_{t-1}^i, T_{t-2}^i, \dots)$$

Such a procedure does not make use of any knowledge the forecaster may have of the structure of the tax, and of probable relationships between the revenues that it will generate and other economic magnitudes. As a result, although univariate techniques are

¹⁵This is the general use of the term in the United States; see, for example, Sunley and Weiss (1991). In the United Kingdom, the same process is commonly referred to as "tax costing."

¹⁶For a fuller account of these methodologies, see, for example, Chand (1975); Schroeder and Wasylenko (1989); and Federation of Tax Administrators (1993).

sometimes used as a standby when nothing better is available, they are not widely used by revenue forecasters.

Forecasting using elasticities

When a forecast of GDP (or GNP) is available, the simplest *conditional* approach to forecasting revenues from a particular tax (such as an income tax), or from a group of taxes, is to employ an estimate of the elasticity of revenue from the tax with respect to GDP, ϵ^i . This elasticity is defined as:

$$\epsilon^i \equiv (dT^i/dY) \cdot (Y/T^i),$$

where Y denotes GDP. Hence, if this elasticity may be assumed to be constant, a forecast of T^i in the forecast period may be derived straightforwardly from a forecast of Y in the same period, together with actual figures for both T^i and Y in some previous period.

To estimate the elasticity from time series observations on receipts from the tax, and on GDP, it is necessary to remove from the former time series the effects of any changes to the tax law that may have been made during the period. To do this, two main approaches have been adopted.

a. The most commonly used method makes use of the estimate that was made by the government, at the time of each change to the law, of what the revenue effect of that change would be. In such exercises, it is usually assumed that the change would have the same *proportional* effect on revenues in each subsequent year. A hypothetical time series \hat{T}^i_t can then be constructed showing what revenues from the tax would have been, in past years for which data are available, if the tax law had been the same as it is in the current year. With sufficient past observations, a simple double-logarithmic regression of the hypothetical revenue series on GDP can then be used to derive a least-squares estimate of the elasticity from the equation:

$$\ln \hat{T}^i_t = a + b \ln Y_t + e_t,$$

where e is an error term that is assumed to be normally distributed about a mean of zero, and the estimated coefficient b corresponds to the elasticity ϵ^i . When fewer than about ten observations are available in the time series, cruder methods may have to be used.

b. An alternative approach may sometimes be possible, if there have been no more than one or two significant changes to the law over the period for which revenue observations are available. In this case, the elasticity may be estimated from a regression of the *actual* revenue series on GDP, in which “dummies” are also included as explanatory variables to capture the effects of those changes to the law:

$$\ln T^i_t = a + b \ln Y_t + c D_t + e_t$$

where D is a (vector of) 0/1 dummy variables denoting different policy regimes.

An estimate of elasticity with respect to GDP can, in principle, be made for any tax. It is more natural, however, to relate certain taxes to other macroeconomic variables. For example, import duty revenues are likely to vary with the value of imports; revenues from a broad-based consumption tax such as VAT are likely to vary with aggregate private consumption expenditures; and so on. The elasticity of revenues from each tax, with respect to GDP, can then be seen as the product of two separate elasticities:

- a. the elasticity of revenues with respect to the “tax base” (such as imports or private consumption); and
- b. the elasticity of that tax base with respect to GDP.

Separate estimates of those two elasticities are useful, if forecasts of the *components* of GDP are already available to the revenue forecaster.

More complex macroeconomic models

The methods summarized above are based on the assumption that the relevant elasticities are constant. In principle, there is no reason why this should be a valid assumption. More generally, regression methods may be used to estimate functional relationships between revenues from particular taxes and a variety of macroeconomic variables; these relationships need not be constrained to imply constant elasticities. Revenue equations for particular taxes were estimated along these lines in the macroeconomic models, which were developed for forecasting purposes in the major OECD countries from the late 1950s onwards.

An important advantage of this approach to revenue forecasting, using econometrically estimated tax revenue functions, is that the revenue forecasts are integrated with the corresponding macroeconomic forecasts. As a result, consistency between the two is guaranteed. There are, however, some serious limitations to the approach. First, many countries do not have sufficient (or sufficiently reliable) data from which detailed macroeconomic models, including tax revenue functions for individual taxes, can be estimated. Second, revenues from certain taxes (such as taxes on wealth, capital gains, and capital transfers) may not be closely related in practice to any variables that are included in conventional macroeconomic forecasting models.

Third and perhaps most important, the approach constrains the revenue forecast to depend on only a small number of macroeconomic variables—for in-

stance, in the case of a corporate income tax, on forecasts of aggregate profits in different sectors, and relevant expenditures such as fixed investment and stock-building. Such macroeconomic relationships are likely to break down, however, if a substantial number of companies are subject to losses.

Structural models of individual taxes

Since the late 1960s, the major OECD economies (and individual states within the United States) have developed "microsimulation models" for their major taxes, particularly those on personal and corporate incomes.¹⁷ These models are constructed from samples of tax return data. Their focus is on the detailed application of the tax law to the structure of the tax base, at the level of individual taxpayer liabilities.

In most cases, the primary purpose of these models has been to assist in revenue estimating (as discussed in the next section). In many countries, however, they have also come to be used in the process of revenue forecasting. For this purpose, data in the sample are projected forward over the forecast period (on the basis of macroeconomic forecasts of the relevant variables); the microsimulation model is then used to estimate the tax liabilities that will arise; finally, adjustments are made for collection lags, to convert that estimate of liabilities arising into an estimate of tax receipts during the period.

Integrated forecasting systems

An obvious problem that arises in using such microsimulation models as a basis for revenue forecasts is that of potential inconsistency between the macroeconomic forecasts (which are used as inputs in projecting the sample data over the forecast period) and the revenue forecasts themselves. In some countries (such as the United Kingdom), this has led to the development of iterative procedures, under which a macroeconomic forecast is first made and revenues are estimated using simple tax revenue functions (as in the section above); the microsimulation models are then used to adjust those revenue forecasts, using "residuals" in the macro tax revenue functions; and the process is repeated several times until convergence occurs.

With developments in computer technology, it should be possible to short-circuit these rather cumbersome procedures by linking the various models together in an integrated forecasting system. Such a system has recently been developed by private consultants for the U.S. State of Massachusetts,¹⁸ and similar

systems seem likely to be adopted more widely in the coming years.

Estimating the Effect of Tax Changes

Conceptual issues

The basic objective of revenue estimating is to assess how possible changes to the tax law will affect tax revenues. Several problems arise in summarizing those changes in a single number.¹⁹

First, a particular change to the law can generally be expected to have revenue effects that vary over time. A change that is introduced at the beginning of a fiscal year will usually have a smaller effect on revenues during that year than it would in a "full year," as a result of collection lags. Furthermore, some changes will have only a *temporary* effect on revenues (e.g., a change in the basis of business income taxation from a "preceding year" to a "current year" basis), while others will have effects that can be expected to build up gradually over several years.

Second, a change to one tax will often affect revenues from other taxes. For example, VAT is commonly levied on the value of sales, inclusive of any excise duties and import duties levied on the same product. In this case, an increase in the rate of excise duty on a particular product will have a direct effect on VAT revenues as well. It will also, of course, have indirect effects. As a result of an increase in excise duty (plus VAT), consumers can be expected to reduce the volume of that good which they consume. Depending on the elasticity of demand, their total expenditure on the good (including taxes) will either rise or fall. Either way, there is likely to be an effect on spending on other goods—and hence, on revenues from the taxes that are levied on those other goods. In addition to these substitution effects, the initial tax increase can be expected to have "second round," macroeconomic effects which have implications for revenues from many other taxes.

The question then arises: Which of these different kinds of effects on receipts from other taxes should be taken into account in the revenue estimate for the initial change to the excise duty? The appropriate answer may well depend on the context in which the estimate is to be used. For example, if revenue estimates are being prepared to show the implications of alternative ways of reducing a fiscal deficit, it may be appropriate to neglect macroeconomic effects on revenues from

¹⁷See, for example, OECD (1988).

¹⁸See Hudder (1993).

¹⁹For a fuller discussion of these problems in the context of the United Kingdom, see King (1986).

other taxes—since they will be broadly similar for all the alternatives that are being considered. On the other hand, to judge how much of a tax increase is necessary to eliminate a deficit, it will be necessary to take account of those macroeconomic effects as well as of the first round, “direct” effects of the tax change.

Methodologies

It is harder to generalize about methods of revenue estimating than it is about methods of revenue forecasting, since tax law changes for which revenue estimates may be needed vary widely. Changes to the rate of a proportional tax (for instance, on wage incomes or total consumer expenditures) are reasonably straightforward to deal with, once the appropriate conceptual basis for the estimate has been established. Changes to an existing tax allowance in a progressive income tax are more difficult, since the revenue estimate requires information about the present allowances and the marginal tax rates of those that receive them. It was to answer questions of this sort that the sample-based microsimulation models (referred to in the section on more complex macroeconomic models above) were initially developed.

But there are many possible tax changes for which even such complex tools provide no assistance to revenue estimators. For example, a proposal to extend a personal income tax to income that is presently non-taxable (such as social security benefits) cannot usually be assessed on the basis of a sample of existing tax returns—since those returns will typically contain no information on exempt income. In these circumstances,

revenue estimators may need to use a wide variety of information sources, and techniques, to estimate the effect of the proposed change. Revenue estimating is, in practice, as much a creative art as a science.

Evaluating Revenue Forecasts and Estimates

Revenue forecasts that are made unconditionally can easily be evaluated in retrospect, when the difference between the forecast and the actual outturn is known. But revenue forecasts that are conditional on particular macroeconomic assumptions are harder to evaluate, since the forecast error may result from inappropriate assumptions as well as errors in the conditional forecast, and the two sources of error can often be difficult to disentangle. Most revenue estimates are even harder to evaluate in retrospect, since such an evaluation usually requires a hypothetical comparison of actual revenues with what those revenues would have been, if the specific change for which the revenue estimate was made had not been implemented.

Despite these difficulties, retrospective evaluations are an important component of an effective revenue estimating and forecasting system because they provide the estimators with an opportunity, and also with a motive, to learn from past mistakes and to improve their estimating methods over time. Revenue forecasters and estimators should not, therefore, devote all their efforts to the future: to the extent possible, systematic ex-post evaluation of past forecasts and estimates should be a part of their work program.

Presumptive Taxation

KENAN BULUTOGLU

- *Why do countries levy presumptive taxes?*
- *What are the major design issues in a presumptive tax?*
- *What are the administrative advantages of a presumptive tax?*

Many developing countries have weaknesses in their tax administration that make it difficult to levy effective taxes. Presumptive taxation is one means to overcome these administrative weaknesses. It may also lead to certain efficiency and equity gains. Although presumptive taxation has been practiced for years in many countries as a pragmatic approach to increasing tax revenues, the analysis of presumptive taxes is relatively scant.²⁰ The purpose of this chapter is to describe presumptive taxation and its advantages and disadvantages.

Presumptive taxation is used mostly as a proxy for an income tax on small businesses. It may also be used as a substitute for an income tax on small farmers, owners of rental property, professionals, independent contractors, and other hard-to-tax groups. Presumptive taxation is occasionally used as a proxy for indirect taxes. For instance, in Turkey, Tunisia, and Morocco, it is used as a substitute for a VAT on small businesses, and in Pakistan, it is used as a substitute for excise taxes.

If used judiciously, presumptive taxation may broaden the tax base by increasing the number of taxpayers and their tax payments, and it may reduce tax evasion—all at a relatively low administrative cost. Although its revenue per taxpayer is generally low, it may have substantial spillover benefits in facilitating the movement of small taxpayers from the informal to the formal sector and as a source of information to reduce evasion.

The main virtue of presumptive taxation is that it may be the only effective way to tax small businesses in developing countries. Since small businesses represent the vast majority of enterprises, this may lead to a substantial increase in the number of taxpayers. In fact, in countries where there is a solid presumptive tax tradition, the number of presumptive taxpayers may be ten to twenty times higher than the number of those subject

to self-assessment on recorded transactions, although this ratio declines with the level of economic development. Presumptive methods may also be effective in cutting audit time and cost, particularly in countries where accounting illiteracy is widespread. Nevertheless, enforcement without safeguards may lead to harassment of and extortion from taxpayers by unscrupulous tax officials. Although, the participation of citizens in presumptive tax commissions may reduce the opportunities for abuse by corrupt officials.

Some countries deliberately charge punitive presumptive tax rates in order to push small taxpayers into the option of self-assessment on an actual income basis. Experience shows that this can backfire, by causing taxpayers to go underground. This shift of taxpayers to the underground economy can outweigh the benefits of adding some taxpayers to the declarative tax regime. Instead of forcing small businesses into a declarative tax regime, the tax administration should keep them in the presumptive tax regime until they are sufficiently large and sophisticated to participate in the regular tax system.

Presumptive taxes may also enhance the efficiency and equity of the tax system.²¹ Presumptive taxes generally take the form of a tax on average or "normal" income. Hence, the marginal tax rate on income above this average income is zero, avoiding the negative incentives associated with high marginal tax rates. In addition, by facilitating more effective taxation of hard-to-tax groups, presumptive taxation may lead to greater horizontal equity in the tax system.

Determination of the Presumptive Tax

There are several different ways in which presumptive taxes on income or profits may be levied. One frequently used approach is for the tax administration to determine a method for estimating income and then to apply it to each taxpayer. A second approach is to apply an assets tax. This approach has become more popular in recent years. A third approach is to apply a turnover or gross receipts tax. A fourth approach is to base the tax on external indicators of income. The first approach is typically applied in developing countries

²⁰See Tanzi and Casanegra de Jantscher (1987), and McLure (1990).

²¹See Tanzi and Casanegra de Jantscher (1987), and Sadka and Tanzi (1993).

to small businesses or establishments. The second and third approaches generally apply to all businesses and are not used exclusively for presumptive tax purposes but may also serve as minimum taxes or as an additional source of revenues. Several Latin American countries use presumptive methods based on wealth. Many francophone African countries use presumptive methods based on gross receipts or turnover. These two approaches are discussed in Chapter IV.

The level of economic sophistication in a country influences the choice of presumptive tax methods. Countries with the least sophistication typically apply very simple presumptive tax methods, while those with more sophistication may apply highly developed methods. Presumptive taxes may apply generally to entire classes of taxpayers or only to taxpayers who fail to file a standard tax declaration.

The first approach to presumptive taxation may make use of very simple techniques for estimating income or more complicated techniques. The simplest approach is just to levy a lump sum on all businesses, although clearly this approach has serious drawbacks. Under a more sophisticated presumptive tax, applying it to business income generally follows a sequence of stages. First, the tax administration conducts a census of taxpayers, under which it registers and records the annual sales volume of each business, if this information is available. Second, the tax administration, sometimes along with a tax commission, determines profit margins for each business activity. To account for differences in average profit margins, activities may be classified by business type, such as trade, craft, and service; by location; and by size. Business types may be further broken down by activity. The tax administration then applies certain rules to determine profit margins by activity. For instance, one rule of thumb may be that the higher the inventory turnover, the lower the profit margin.

If information on turnover is not available, then the tax administration must also devise methods for determining turnover. In manufacturing, the tax administration may collect information on purchased materials and infer production volume from the use of these materials. It might then determine profits as a percentage of sales. In service industries, material purchases are less significant as an indicator of business volume; instead, the tax administration might use the service capacity of the establishment (such as the number of tables, seats, and employees in restaurants, theaters, and barber shops); the amount of cargo space in motor vehicles; and so on, as an indicator of turnover or profits.

Several countries have adopted the *tachshiv* (assessment guidelines) approach originally developed in Israel, which emphasizes the use of objective factors to estimate the income of taxpayers who fail to keep adequate books and records.²² Physical inputs and factors such as the number of employees are critical to the determination of an enterprise's income. The *tachshiv* contain instructions for estimating the enterprise's income according to the kinds of services it provides, its equipment, its location, work schedules of employees, and other criteria. Each *tachshiv* is prepared with detailed research and visits to a representative sample of businesses. This determination results in measures of the average profitability of the sector and the relationship of specific characteristics of the enterprise to profitability.

This approach has been criticized. One criticism is that taxpayers whose incomes are above average for their line of business may intentionally fail to keep adequate records for a declarative tax so that they fall under the presumptive tax. In addition, reliance on precise factors to determine income may transform the tax into one on those factors, rather than a general income tax, thus distorting optimal use of factors of production and other business decisions.

Presumptive tax systems generally provide for the public to contest the government's determination of profit margins and costs. Individual taxpayers generally cannot contest the decisions that establish profit margins and costs. But some countries allow both taxpayers' representative bodies, such as legal trade unions, chambers of commerce, and the tax administration, to contest regulatory decisions. In practice, however, grievances are usually settled through political decision.

The tax administration may determine the presumptive tax collectively or individually. The collective assessment method has the advantage of administrative simplicity while the individual assessment method has the advantage of greater accuracy. In France and in some of its former colonies, the collective presumptive tax has traditionally been applied to the smallest businesses and to some selected sectors, and individual assessment to businesses intermediate in size to the small taxpayers and the self-assessed. Some countries, such as Turkey, have only collective assessment.

Under collective assessment, the tax administration establishes presumptive income for groups of taxpayers, corresponding to different activities. The tax administration assigns each taxpayer to a group, which

²²See Tanzi and Casanegra de Jantscher (1987).

determines the taxpayer's tax liability. The tax liability and taxpayer's classification may be revised periodically. Finally, taxpayers are given the opportunity to contest the classification of their business activities. In some countries, taxpayers can resort to court action if they are unsatisfied with their tax treatment.

Under individual assessment, taxpayers are not expected to remain passive as in collective assessment; they may be required to submit certain information annually so that the administration can assess their net income by applying cost-profit ratios. The tax administration assesses the taxable income of each taxpayer, by mimicking the declaration procedure. Finally, under individual assessment, the taxpayer has the opportunity to negotiate with the tax administration or to appeal through the judicial system.

In individual assessment, the tax officer may tutor the taxpayer in the self-assessment procedure, as is found in the British system of assessment. Such assessment, however, is costly and a potential source of corruption and taxpayer harassment. When facing a tax officer invested with discretionary powers, the taxpayer is in a weak position; a scared and/or astute taxpayer may seek collusion with the tax officer. This danger is particularly strong if the taxpayer is not protected by a right to court action. Even when tax officers are honest, a negotiated assessment can create a feeling of fiscal harassment, even inquisition on the part of the taxpayer. A zealous application of individual *forfait* in France in the 1950s caused a tax revolt that culminated into a strong political party (Poujadism).

Under both collective and individual assessment, the tax administration may update records only every few years to lower administrative costs. Multiyear applicability of the presumptive tax is advantageous to businesses in expansionary or inflationary times, but it becomes more burdensome when profits decline.

Promotion of taxpayers from individual assessment to a self-assessment system has several benefits. First, the tax administration may reduce the costs of individual assessment. Second, small businesses get invoices to deduct their costs and register their transactions, boasting self-enforcement in the business tax. Third, malpractice stemming from contacts between taxpayers and tax officers is largely eliminated.

Half-Presumptive Methods in Self-Assessment: Presumptive Cost

Halfway between the presumptive tax and the self-assessment tax is the method of presumptive cost de-

duction, under which the taxpayer declares revenues but not costs. Costs are then estimated on a presumptive basis. When costs are deductible presumptively, most countries also allow taxpayers the option to deduct the actual costs. A generous presumptive cost deduction erodes taxable incomes. When deduction of actual cost is an option, there is no justification for a generous presumptive cost deduction. Taxpayers experiencing high costs can opt for actual cost deduction. When there is an option, however, the taxpayer can erode the tax base by concentrating the costs in a year of actual cost deduction, then shifting to presumptive cost deduction in subsequent years. A minimum time period, say three years, should be required to prevent such abusive shifts from one method to another. One common application occurs in developing countries, and increasingly in the former centrally planned economies, where many people obtain rental income without setting up a business. A bookkeeping obligation for cost deductions would be cumbersome for most of these property owners. Presumptive cost deduction alleviates their compliance costs.

Presumptive Taxation as a Shortcut to Audit

In the self-assessed income tax, cost or profit ratios are used to reduce tax evasion and audit time and cost. A deviation of taxpayer declarations from such norms can be sanctioned in two ways: either the presumptive norms are non-negotiable and applied automatically, or the taxpayer has the right to challenge the presumptive ratios, while still bearing the burden of proof. The former is cost effective but may be inequitable for some taxpayers. The latter is prevalent in advanced income tax systems, and its effectiveness depends on the existence of a fair and speedy judicial procedure.

The very existence of cost norms can boost self-enforcement, provided that they are applied randomly—even if sporadically. They can induce taxpayers to declare plausible costs and profit margins and to keep evidence of their transactions. In developing countries, profit, cost, and output standards are seldom used in computerized programs to identify the suspicious returns and to speed up the audit; therefore, self-enforcement is either weak or absent. The use of presumptive cost and profit norms without any possibility of taxpayer's contestation is a common practice. Any declaration that reduces the tax base by deviation from official cost and profit ratios is rejected. Modern income tax laws, however, allow taxpayers to prove the authenticity of their declarations. But such declarations can trigger an audit and eventually a costly litigation.

To avoid this outcome, some countries give the tax administration power to negotiate with the taxpayer. Unless rules of negotiation are clear and discretionary powers minimal, however, corruption can be rampant.

Presumptive Taxation Based on Income Indicators

The presumptive tax models described so far determine the tax base by estimating sales, costs, or asset values. Another form of presumptive taxation departs further from actual transactions and determines the tax base by using external indicators of income, such as personal expenditures and wealth accumulation.

The tax administration may use external income indicators to identify nonregistered taxpayers and to verify the income of existing taxpayers. When taxpayers do not comply with their bookkeeping obligations, make no income declaration, or file a declaration that is rejected due to bookkeeping irregularities, many countries allow the use of indirect indices—such as living standards and annual increases in net wealth—to assess the taxable income. Indirect or external income indicators that are inconsistent with the declared income can be used for assessment even if the taxpayer's books show no irregularities. But a tax based on external income indicators is exceptional, and used only after the taxpayers are given a chance to prove their nontaxable sources of income and wealth.

Taxation based on income indicators is usually complementary to self-assessed income taxation. In most countries, its use is restricted to sustained criminal or underground activities, such as drug dealing, smuggling, and gambling. Wealth accumulation and standard of living of a taxpayer can be investigated by the tax administration as part of an audit work. But some countries require taxpayers to make annual declarations of their living standards and total wealth. If accumulated over several years, such information can render the discrepancies between actual and declared income increasingly obvious and the taxpayer vulnerable to audit.

In developing countries, indicator-based taxation is a speedy way to audit. It reduces the evasion of small, hard-to-tax taxpayers. It can capture incomes from underground activities. Adequate safeguards, however, must be devised to protect honest taxpayers and prevent corruption. To that effect, a special committee can be invested with the power to determine the presumptive tax based on wealth and expenditure indicators. Taxation on living standards or wealth accumulation may increase compliance. In some countries, wealth

indicators are by themselves a base for a minimum income tax.

Incentive Effects of Presumptive Taxation

Presumptive taxation may produce a more efficient outcome than regular taxation by offering no discouragement to economic activity on the margin;²³ rather, it may encourage production because producers keep all profits on the margin. This incentive, however, tapers off the closer the presumptive tax approximates the actual tax liability.

Table VI.3. The Stages of Presumptive Taxation

I. Stages common to a collective and individual presumptive tax:

Stage 1: Declaration of sales volume by taxpayer	Stage 2: Determination of profit margins by type of activity by tax administration or committee	Stage 3: Litigation by business or organization or tax administration
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II. Stages of a collective presumptive tax:

Stage 4: Determination of taxpayer's business type by tax administration	Stage 5: Determination of taxpayer's classification by tax administration	Stage 6: Appeal by taxpayer and resolution by negotiation or by court action
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III. Stages of individual presumptive tax:

Stage 4: Annual declaration of sales volume by taxpayer	Stage 5: Assessment by tax officer using data from stages 4 and 2	Stage 6: Appeal by taxpayer and resolution by negotiation or by court action
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The presumptive tax may be an entry barrier to small business compared to the absence of any tax. When the formal sector or large enterprises are taxed, however, the exemption of the informal sector or small enterprises would distort economic decisionmaking. A minimum contribution to tax revenues may enhance the risk of business creation and encourage enterprises to go underground. These potential negative effects of presumptive taxation on small enterprises argue for a moderate presumptive tax and taxes that vary according to potential incomes.

The most important problem with presumptive taxation is that it may lead to erosion of the self-assessed business tax base through the use of fake invoices. Experience shows that enterprises under the declarative

²³See Sadka and Tanzi (1993).

regime use presumptively taxed enterprises as their suppliers of fake invoices to boost their costs. To limit such practices, the tax administration has to monitor the invoices issued by the presumptively taxed businesses. This, in turn, reduces the cost savings of the presumptive tax.

Conclusion

Experience suggests that the shortcomings of presumptive taxes stem mostly from a lack of clear objec-

tives. When overstretched for revenue purposes, a presumptive tax may lead to corruption and oppression of taxpayers. When used for administrative convenience and low compliance costs, it may degenerate into outright exemption as a result of insufficient monitoring of small businesses. A successful presumptive tax should serve primarily to prepare small businesses for self-assessment and secondarily to enhance revenues.

The stages of presumptive taxation are outlined in Table VI.3.

Minimum Taxes

JANET STOTSKY

- *Why do some countries levy a minimum tax?*
- *What are the main issues in the design of a minimum tax?*
- *Should the minimum tax be levied on businesses or individuals?*

Minimum taxes overlap to some extent with both assets taxes and presumptive taxes, but they may also be neither. Minimum taxes are generally based on assets, turnover, or redefined income and they apply to both large and small enterprises. Assets taxes may serve as minimum taxes but may also serve as nonminimum taxes that apply to all enterprises. Presumptive taxes may have the same form as minimum taxes but they generally apply only to small firms that are incapable of being incorporated into the regular tax. Since Chapter IV discusses assets taxes and the previous section discusses presumptive taxes, this section focuses on the distinct role that minimum taxes can play in a tax system.

Definition and Use

Many countries have introduced some sort of minimum tax to supplement either the regular business income tax or individual income tax. The purpose of a minimum tax is largely to ensure that businesses or individuals with economic income do not regularly avoid paying income tax. Many developing countries have business minimum taxes while individual minimum taxes are rare. In developing countries, the business minimum tax may apply to both corporate and noncorporate enterprises. A few industrialized countries also have explicit minimum taxes. The United States has both corporate and individual minimum taxes, where they play a complementary role. Canada has only an individual minimum tax. Norway and Denmark also levy a supplementary tax, which is a form of minimum tax. This discussion will examine the rationale for minimum taxes and important issues in their design.

Rationale for Business Minimum Taxes

A business minimum tax may be used to enhance the equity (or perceived equity) and efficiency of the business income tax. Inequities in a business income tax

may arise because of differences in tax compliance across businesses, because of differences in the ability to use tax preferences, and other reasons. Under an equitable business income tax, businesses with the same taxable income would pay the same taxes. In many developing countries, the ability to administer the business income tax is limited, leading to widespread tax evasion. As a consequence, businesses with equal incomes may pay very different taxes, simply because of differences in tax compliance. A business minimum tax may reduce this inequity by taxing businesses on some notion of income that is independent of their declared income for tax purposes. A business minimum tax may also facilitate tax collection from taxpayers with business income. This was one rationale for the adoption of the business assets tax in Mexico.²⁴

In many industrialized and developing countries, the business income tax is characterized by a proliferation of tax preferences, granted in the form of tax exclusions and deferrals. The aggregate business income tax base may be significantly eroded by these tax preferences. A minimum tax offers two ways of increasing business tax revenues from businesses that have benefited excessively from these tax preferences. First, it forces all businesses to pay either the regular business income tax or the minimum tax. Second, it may discourage businesses from taking advantage of tax preferences that would lower their regular tax liability so much that they end up incurring a minimum tax liability. By avoiding excessive tax preferences, they increase their regular business income tax liability. Ambivalence about the role of tax preferences was a main argument in favor of the adoption of the corporate alternative minimum tax in the United States.

In economies beset by high inflation rates, the favorable treatment accorded debt finance through the deduction of nominal interest payments supports this rationale for a minimum tax. With high inflation, businesses with significant amounts of debt may get such large deductions for nominal interest payments that they routinely have tax losses and are able to avoid paying the business income tax for many years, even though they are earning substantial economic income. In Argentina and Mexico, the erosion of the tax base

²⁴See McLees (1991).

from high inflation was one important factor that led to the adoption of the business assets tax.

On efficiency grounds, there are arguments for and against a minimum tax. Sadka and Tanzi (1993) argue that businesses may use capital inefficiently because socially inefficient uses are intangible and thus untaxable while socially efficient uses are taxable. They argue that a tax on "normal" or presumptive income (which may be seen as a minimum tax) may enhance efficiency because it may have fewer distortions at the margin than the regular income tax. This would encourage businesses to use capital in socially efficient ways. In the U.S. context, Graetz and Sunley (1988) argue that by equalizing the marginal tax rate across industries, a minimum tax may enhance efficiency. On the other hand, they argue that by penalizing businesses that may have some advantage in tax-preferred activities, the minimum tax may reduce efficiency across businesses in the same industry. The ultimate efficiency effects of a minimum tax are quite complicated.

A minimum tax can also be justified as a form of business license tax. Business license taxes have not precluded the adoption of a minimum tax in many countries including France, which levies both taxes. Nevertheless, the two taxes must be distinguished. The minimum tax is always credited against the regular business income tax. But there is no refund if the minimum tax turns out to be higher than the regular tax. Business license taxes are generally allowed among deductible charges in the business income tax.

Forms of Business Minimum Taxes

The business minimum tax may take many forms. The appropriate form of the tax depends on the specific objectives that it is intended to accomplish. In its simplest form, the tax may require the payment of a fixed nominal amount from each taxpayer. Although such a tax is efficient in that it essentially functions as a lump-sum tax (as long as it applies equally to all forms of businesses), it is inequitable in that it is not based on any proxy for income. It may also be used in combination with a business minimum tax where the information needed for applying a minimum tax is lacking. The amount has to be set carefully to insure that businesses do not simply pay this nominal sum rather than the minimum tax.

An alternative is to levy the tax as a relatively low percentage of the turnover (or gross receipts) of the business. This form of business minimum tax is frequently found in countries influenced by French tax practice. France introduced a minimum business tax in

1973. Initially, this minimum was a fixed amount of FF 1,000, but now the rate varies according to the size of turnover, and it currently ranges from 0.5 percent for corporations with a turnover of FF 1 million or less to 0.215 percent for those with a turnover of FF 10 million or more. Many countries in francophone Africa also use a minimum business tax based on turnover.²⁵

The advantage of a turnover-based business minimum tax is that turnover is likely to be the most easily measured financial variable for a business and must be computed for the payment of other taxes, such as the VAT. Thus, turnover is likely to be more readily available to tax authorities. In addition, in an economy where prices are not regulated, prices and hence turnover adjust with inflation. The tax is thus not distorted by inflation. The disadvantage of a turnover-based business minimum tax is that turnover bears no necessary relationship to any measure of income. A business with a large turnover might have negligible profits or losses, but would still be required to pay a substantial minimum tax, while a business with a small turnover might have substantial profits and would pay a small minimum tax. Thus, a turnover-based business minimum tax does not provide a good proxy for an income tax. In addition, a turnover tax is deficient compared to a VAT because it cascades from one level of production to the next. Thus, the rationale for a turnover-based business minimum tax rests mainly on practical considerations.

Another alternative is to levy the tax as a relatively low percentage of the assets of the business, applying to gross, net, or fixed assets.²⁶ The use of an assets tax as a business minimum tax is found in Latin America. An assets-based business minimum tax has a stronger theoretical appeal than one based on turnover in that economic income could be expected to bear some systematic relationship to assets. Typically, it is assumed that in a well-functioning capital market with capital mobility, the rate of return on capital is equalized across investments. Hence, a business assets tax could be a reasonable, though imperfect, proxy for an income tax. This form of tax is perhaps most appropriate for most developing countries.

Mexico has applied a business assets tax since 1989. The tax is levied on business assets at a 2 percent rate. The purpose of the assets tax is to facilitate collection of the income tax on business income, but it also functions as a minimum tax. The assets tax liability is designed to be roughly equal to a taxpayer's income tax liability. For instance, if the taxpayer is assumed to earn

²⁵See Abdel-Rahman (1994).

²⁶See Chapter IV for further discussion of assets taxes.

a 6 percent return on assets and the business income tax rate is 35 percent, then a 2 percent tax on assets is roughly equivalent. Taxpayers are allowed to credit their Mexico income tax payments against their Mexico assets tax liability. Thus, if the income tax liability is greater than or equal to the assets tax liability, no additional assets tax is levied.²⁷

Another alternative is to levy the tax on some redefined notion of business income, as in the United States. As part of the 1986 reform of the U.S. income tax code, a corporate alternative minimum tax was added to the regular corporate income tax. This tax replaced a previous minimum tax, which was levied as a surcharge on the corporate income tax for the use of certain preferences. Under the reconstituted minimum tax, businesses are required to compute taxable liabilities under both the regular corporate income tax and the alternative minimum tax, and then they must pay the larger of the two tax liabilities. The difference between the alternative minimum tax payment and the regular tax liability may, with some exclusions, be credited against future tax liabilities, but may not reduce the regular tax liability below the alternative minimum tax liability. The alternative minimum tax is computed by making certain adjustments and adding certain tax preference items to income. Gerardi, Milner, and Silverstein (1992) discuss the major adjustments and preferences in the U.S. corporate alternative minimum tax.

This form of minimum tax is perhaps appropriate for the United States in that the minimum tax is motivated by an ambivalence about the use of legal tax preferences rather than by concern about administrative weaknesses or the distorting effects of inflation on business income. Thus, it gets directly to the heart of the problem. This form of minimum tax, however, may be less appropriate in countries where administrative weaknesses or high inflation are the principal problems since it is really not intended to solve these problems.

Determination of the Tax Base

The appropriate application of the minimum business tax requires careful determination of the tax base: either turnover, assets, or redefined income. Turnover is the most readily measured of these tax bases. Nevertheless, in many developing countries, it may be difficult for the tax authorities to get accurate measures of turnover for some businesses, particularly retail establishments and farmers. It is easier to get accurate mea-

sures of turnover for manufacturing businesses. Even in industrialized countries, it may be difficult to get accurate measures of turnover for small businesses, particularly those providing services, such as tailors and hairdressers. To overcome obstacles in measuring turnover, the French developed the "forfait" system, essentially a presumptive tax, in which the tax is based on some objective characteristics of the business.

The assets tax is generally imposed on a taxpayer's gross business assets. Assets include cash and securities, receivables, inventories, land, and other fixed assets at depreciated value, and intangible assets at amortized value. Alternatively, it is possible to impose the tax on fixed assets (land, plant, and equipment) or on net assets (gross assets net of debt-financed liabilities) alone.

Various considerations enter into the choice of which asset measure to use for the tax base. If the purpose of the tax is to provide a proxy for a broad-based income tax that does not favor debt-financed assets, then levying the tax on gross assets is appropriate. If instead, the purpose is to provide a proxy for a business income tax that allows a deduction for interest payments on debt but not for dividends, then levying the tax on net assets is appropriate. Levying the tax on fixed assets has merit on practical grounds. A tax on assets may be difficult to administer fairly because of the inability to measure some components of assets accurately because of transitory variations in asset value, illiquidity, and inflation. Current assets have a larger transitory element, but are more liquid and less distorted by inflation. Ideally, fixed assets and intangible assets should be valued at fair market value, but usually the only available measure of value is historic costs reduced by depreciation or amortization, respectively. Land, although it is not a depreciable asset, poses a similar problem. It is possible to adjust balance sheet items through indexation to account for inflation.

Double taxation of certain assets is potentially a problem in certain instances where taxable businesses own financial interests in each other or own each other exclusively. It is possible to solve this problem, however, by selectively exempting these assets from the tax base where these conflicts arise.

The determination of the base of the U.S. alternative minimum tax reflects the objectives of reducing the benefits of tax preferences and enhancing the equity of the business income tax. Thus, the additions to income are derived from parts of the tax code which create large differences between economic and taxable income. Graetz and Sunley (1988) and Lyon (1991) discuss these issues in detail.

²⁷See McLees (1991).

Determination of the Tax Rate

The tax rate that is chosen should reflect the revenue and incentive objectives of the business minimum tax. A key point is that the minimum tax rate should not be set so high that it results in hardship for a business with true economic losses, but the rate should be set high enough that the business tax's equity and efficiency goals are achieved. Thus, the appropriate rate is likely to vary, depending on revenue needs, the nature of the minimum tax, and the structure and rates of the regular income taxes that they supplement.

Other Issues

Another design issue relates to international coordination of income tax regulations to allow businesses to credit their minimum tax liabilities against their domestic business income tax liabilities. It is important to develop rules so that any minimum tax qualifies for the foreign tax credit. A problem may arise with minimum taxes based on turnover or assets in that some countries only allow income tax credit for taxes that are explicitly levied as income taxes. This problem arose for U.S. firms under the initial version of the Mexico assets tax since U.S. law does not allow a U.S. taxpayer to credit an assets tax payment against the U.S. income tax liability. To allow U.S. businesses to qualify for the foreign income tax credit, the Mexico income tax was modified by allowing businesses to credit their income tax payment against their assets tax liability rather than allowing businesses to credit their assets tax payment against their income tax liability.

Another important design issue relates to the ability to credit minimum tax payments against the regular income tax liability in the future. Under a typical business minimum tax, businesses are able to credit in part or in full the difference between the minimum tax and regular income tax liabilities against future business income tax liabilities. If this credit is not indexed, it falls in present value terms the longer the business must defer the use of the credit. If the credit is indexed, this problem does not arise. Under the Mexico assets tax, the credit is indexed, thus preserving its value under

conditions of high inflation. Under the U.S. corporate alternative minimum tax, the credit is unindexed, though the relatively low rate of inflation in the United States makes this less of a problem than it would be in countries with higher inflation rates.

Individual Minimum Taxes

There are also different ways to levy an individual minimum tax. One alternative is to levy a tax on the assets of self-employed business owners or on personal property, which allows its extension to all individual taxpayers. The United States and Canada have explicit individual minimum taxes. The U.S. individual minimum tax has the same basic structure as the U.S. corporate alternative minimum tax, with the two complementing each other. The Canadian minimum tax is similar to the U.S. tax; there is, however, no corresponding business minimum tax. The objectives are the same: to enhance the equity and efficiency of the individual income tax.

Some countries, such as Norway and Denmark, use supplemental taxes on high-income taxpayers to ensure that they pay their fair share of tax. These taxes are similar in nature to minimum taxes, though with somewhat different application. Norway levies an 8.5 percent supplementary tax on gross income, applicable over a high threshold. Denmark levies a 12 percent supplementary tax on "personal income" (which is roughly gross income minus income from capital), applicable over a high threshold. Shome (1993) discusses other ways to levy supplemental taxes.

Under a fully integrated individual and business income tax system, there would be no need for a separate business minimum tax, since all income would be taxed at the individual level. Even without full integration, it is possible to question the need for a separate business minimum tax, if the ultimate incidence of the business tax falls on owners of capital, a matter which remains open, however. As a practical matter, the business minimum tax is an essential counterpart to the individual minimum tax and is more relevant than the latter for most countries.

The Interrelationship Between Tax Policy and Tax Administration

ANGELO G.A. FARIA AND M. ZÜHTÜ YÜCELİK

- *What are the interrelated roles of tax policy and tax administration in designing and operating a tax system?*
- *How do tax withholding schemes contribute to improved compliance and enforcement and alleviate the burden of tax administration?*
- *Should schedular taxes be preferred over a global income tax in developing countries with weak tax administration?*
- *How do exemption thresholds, presumptive taxation, and minimum taxes help improve revenue productivity and remedy problems in enforcement?*

While there may be some disagreement on the extent to which government should be involved in attaining economic objectives, its overall desirability is generally accepted to be crucial. The government's role requires both that it is able to finance its activities in a noninflationary way through compulsory extraction of resources from households as well as that the resultant distortions constituted by taxes as wedges that influence relative prices are minimized. Herein lies the primacy of tax policy in helping to attain economic policy objectives.²⁸ More importantly, in the same way that tax policy should have a dynamic orientation to respond to changing economic circumstances, tax administration must itself evolve an internal dynamic to promote the effective application of tax policy.

Thus, tax policy and tax administration are inextricably related.²⁹ For the design of tax policy to be successful, it must also pay due attention to administrative constraints; and, measures to improve tax administration should help to make the implementation of designed tax policies more effective. Put simply, idealistic tax policy can complicate tax administration, while ineffective tax administration can undermine tax policy.³⁰ Hence, failure to coordinate these activities is likely to affect adversely the pace and sustainability of the tax reform process.

Tax revenue yield is influenced by both tax policy and tax administration.³¹ The concern of tax policy is to ensure the elasticity or responsiveness of potential revenue to overall economic growth and this depends on how the tax bases, and the tax rates applied to them, are established. For example, if tax bases are eroded because of tax exemptions and deductions for achieving various social and political welfare objectives, tax rates would have to be raised on taxable items, in principle, to secure a given level of potential revenues. There is, however, a limit to which tax rates can be raised before they begin to affect adversely the behavior of economic agents, in particular, as regards their decisions to work, consume, save, and invest.

Tax administration assumes that tax bases and rates are appropriately established and seeks to secure as much as possible of the resulting potential tax revenue effectively and efficiently. The more complex it becomes to administer taxes because of the need to ensure the correct application of numerous exemptions and deductions and multiple tax rates, the less effectively will the tax administration collect the potential tax. At the same time, its efficiency will also be diminished because the costs of such collection will rise.

In sum, an appropriate strategy for tax reform would first involve studying the tax structure and setting appropriate policy goals, and then modifying these in the short term by taking cognizance of the associated administrative problems. If the ordering were reversed and administrative considerations became the binding constraint in a tax reform, which by its very nature is a longer-term process, the tax system is likely to play only a very limited role in achieving economic policy objectives.

Inasmuch as the characteristics of tax policy have been explored in detail in the other sections of this Handbook, the remainder of this section is devoted to an examination of the various aspects of a tax system

³¹This linkage may formally be expressed as:

$$\text{Tax revenue/GDP} = (\text{Tax base/GDP}) \times (\text{Tax collected/Tax base}).$$

The maximization of the first term on the right-hand side of the equation represents the concern of tax policy, while that of the second term represents the concern of tax administration. This ordering brings out the key insight that the tax base must first be clearly defined through tax policy and then fully captured for revenue purposes through tax administration.

²⁸See Bahl and Martinez-Vasquez (1992).

²⁹See Casanegra de Jantscher (1990).

³⁰See Mansfield (1988).

that have a bearing on the interplay between policy and administrative concerns.

Statutory Versus Effective Tax System

A tax system may be described in two ways: (1) its statutory provisions covering tax rates and bases, methods of payments, and so on as prescribed in tax laws; and (2) its effective impact reflecting actual implementation of tax laws.³² Several factors are responsible for the possible divergence between the statutory and effective aspects of a tax system:

- Tax evasion resulting partly from complex tax laws reducing the compliance level; and largely from the inability of tax administration in enforcing tax laws;
- Poor level of accounting and bookkeeping practices in the country precluding reliable records for determination of taxable bases, which is a crucial element of modern income and sales taxes;
- Lack, or poor application, of sanctions against tax offenders. For example, low- and middle-income developing countries, such as Côte d'Ivoire, Ghana, Lesotho, Mauritius, Sierra Leone, Togo, and Zaïre collected on average about 37 percent of their tax revenue during 1986–92 from foreign-trade based, convenient tax handles, notwithstanding the existence of a broad range of domestic taxes, reflecting their administrative limits.³³ This happens even though excessive dependence on taxation of foreign trade compromises efficiency and equity objectives.

Simplification of the Tax System

A tax system with several rates and various deductions and exemptions can substantially reduce its enforceability by the tax department and compliance by taxpayers; hence the simplification of the system is essential in tax reforms. A tax administration with limited resources of staff and means cannot effectively monitor, in situations involving a large number of taxpayers, sales tax with multiple rates or an income tax with various deductions and exemptions.³⁴ In industrial countries, a tax administration may have sufficient number of well-trained staff and material resources to do this task, but both compliance and enforcement costs may be significantly higher than economically justifiable. The experiences in Argentina, Bolivia, Colombia, and the United States point in the direction of simplification. In Bolivia, the 1986 tax reform replaced enter-

prise income tax by a net worth tax. A simple tax based on gross sales revenue replaced all taxes (income taxes and VAT) on small enterprises. A broad-based VAT was adopted with a single rate and few exemptions, which replaced excise taxes with multiple rates.³⁵ The 1989 tax reform in Argentina abolished several taxes because either their revenue yield was very little or they created significant inefficiencies in the economy.³⁶

The 1986 tax reform in Colombia simplified the income tax by eliminating personal exemptions, income splitting, and most itemized deductions and hence the need for filing tax returns by most taxpayers.³⁷

In the United States, the 1986 tax reform simplified the tax system to a large extent by eliminating itemized deductions. Compliance cost was also reduced significantly. According to simulations run by Slemrod (1989), payments for professional assistance by taxpayers were likely to decline ranging from 28 percent to 37 percent.

In Israel, on the other hand, both the 1975 and 1987 tax reforms proposed complex tax policies to ensure economic efficiency and tax equity without taking into account the constraints and opportunities of tax administration and therefore serious gaps were observed between goals and actual results. Several aspects of the reform were "diluted" because of administrative limits in applying requirements of the tax reforms. The tax administration resisted or simply ignored several aspects of the reforms.³⁸

Current Payment Systems and Tax Policy

Current payment systems are used mainly for income taxation purposes to make income tax more effective as a fiscal policy instrument. They enhance the automatic stabilizer role of a progressive income tax.

Current payment systems play a crucial role in maintaining the real tax revenue in economies with high inflation; without them, the income tax might have a destabilizing effect in such economies by failing to absorb excess demand. Current payment of income tax is also convenient for taxpayers because it is transferred to the Treasury during the year in which the income has been earned, so that taxpayers will budget their taxes accordingly and avoid payment of large sums in one installment at the end of the taxable period. In inflationary conditions, collection of current payment in-

³²See Tanzi (1987).

³³See Tables 4, 5, and 6 in the Appendix to Chapter VII.

³⁴See Casanegra de Jantscher and Bird (1992).

³⁵See Bird (1991).

³⁶Ibid.

³⁷Ibid.

³⁸See Radian and Sharkansky (1979) and Jenkins (1989).

stallments becomes more crucial to prevent the erosion of real revenue.³⁹

Current payment systems may use two techniques: (1) withholding on wages, salaries, and interest and dividends; and (2) estimated tax payments for self-employment incomes.⁴⁰

Tax withholding

Withholding on wages and salaries represents a major source of current payment revenue in many countries. The idea of tax withholding was first introduced in the United States in 1943 to accelerate collection of income tax during World War II. It was adopted gradually by other countries. The withholding system is now applied in two major forms: (1) noncumulative withholding; and (2) pay-as-you-earn (PAYE).⁴¹

Noncumulative withholding may have proportional or progressive rates but it requires an annual adjustment of tax liability for the taxable year as a whole. Under the PAYE system, withholding of the tax is made in a cumulative manner from one pay period to the next. The employer should determine cumulative totals of wages paid and of tax withheld for each employee in each pay period. The difference between the tax due on total wages paid-to-date and total tax withheld-to-date gives the amount of withholding required; total withholding for the year gets very close to the actual liability of employees. The PAYE system has been used in many countries as a final tax and thus freeing taxpayers from filing an annual tax return and the tax administration from processing a large number of returns with little revenue prospects.

Under both systems, definition of the withholding base is important. A comprehensive withholding scheme would require inclusion of all payments, that is, bonuses, premiums, overtime pay; and monetary values of benefits-in-kind such as housing, vehicle, food, and servants provided by the employer.

A major problem in withholding schemes may arise from retention of taxes withheld by employees. The tax administration should monitor closely transfer of taxes to the Treasury and apply sanctions on delays. Such retentions constitute interest-free loans for employers and in particular, partial nonpayment in inflationary conditions. Monitoring of employers would be rela-

tively easy because the number of employers would be much less than that of employees.⁴²

Withholding is also used for taxation of interest and dividends as it constitutes a convenient tax handle applied at the time of payment of such incomes by payers. Withholding rates are proportional and the payee may be required to file a tax return at the end of the taxable year and include such income in their total income. They may claim tax credit for tax amounts previously withheld. In many countries, tax withholding represents final taxation for interest and dividends and their inclusion in total income is not required, mainly for administrative convenience. Otherwise, the tax administration would need lists of payments for such incomes by payers, indicating amounts paid and tax withheld by payee; and it would also need to cross-check these data against tax returns filed by payees, which may create a large drain on administrative resources.

Estimated tax payments

This type of current payment is applied to companies and self-employed taxpayers, for example, professionals, traders, craftsmen, and farmers. In the absence of such practice, equity and revenue objectives of taxation would be compromised in view of tax withholding on wages and salaries of employees.⁴³

As withholding on self-employment income would be impossible, current payment would require estimation of current income by taxpayers.⁴⁴ Since taxpayers cannot estimate easily their income for the current year, the preceding year's declared income and tax payments are usually taken as reference. Taxpayers are required to pay the same amount of tax for preceding year minus total tax withholding. Taxpayers should be authorized to amend their current income levels in case of fluctuations during the year compared with those initially declared; and underestimations exceeding a set percentage, say 10 percent to 25 percent, should be penalized to deter willful reduction of estimated tax payments.

Schedular Income Taxes Versus Global Income Tax

Serious doubts have been raised about global income tax in countries with limited administrative resources despite a worldwide movement toward globalization in the 1970s and 1980s. A global income

³⁹This is generally known as the Tanzi effect. See Tanzi (1977).

⁴⁰Only a few countries (Benin, Mali, Niger, and Senegal) use withholding for turnover tax purposes. It is applied as a percentage of imports of the informal sector and constitutes a final tax.

⁴¹For a technical description of current payments systems, see Griffith (1973).

⁴²See Griffith (1973).

⁴³Ibid.

⁴⁴Excluding interest and dividends subject to tax withholding.

tax may be desirable for equity purposes but not viable for various reasons.⁴⁵

First, there may be political obstacles to globalization especially from members of the emerging middle class in many developing countries. Fears are sometimes expressed also on account of heavy taxation of investment income leading to the possibility of capital flight.

Second, determination of global income by the taxpayer constitutes a major problem in developing countries. Professional, rental, business, and capital incomes cannot be easily determined because of the poor state of accounting practices, the high level of illiteracy among taxpayers, and limited use of financial institutions in commercial transactions. All these conditions hinder production of reliable data for the tax administration to determine global income.

Third, the tax administration has limited resources of staff and materials to satisfy requirements of a universal filing. As a result, a global income tax in a country with weak enforcement may be transformed in practice into a schedular tax applied only to employment income.⁴⁶

An interesting experience took place in the Philippines in 1987 as schedular taxes replaced a global and comprehensive income tax which did not achieve its equity and efficiency objectives; moreover, it caused hardships on both taxpayers and the tax administration. Despite its progressive rates, the global income tax base was eroded by large optional deductions. The present income tax system comprises:

- a tax on wages and salaries with progressive rates reaching a maximum of 35 percent and allowing deductions only for dependents;
- a uniform final withholding tax of 20 percent on capital income;
- a progressive tax on business income, also reaching a maximum of 35 percent; and
- a company tax of 35 percent.⁴⁷

Exemption Thresholds, Presumptive Taxation, and Minimum Taxes

Although a comprehensive tax base may be desirable for equity and efficiency, tax policy experts have to agree to limit the coverage of each tax to the number of taxpayers with which the tax administration can

effectively cope through high exemption thresholds.⁴⁸ Administrative improvements feasible in the short term may allow expansion of coverage to some extent. With experience, this coverage may be further expanded by the administration over the medium term. If a large coverage is desirable on equity and/or efficiency grounds, the administration should be prepared to assume additional tasks provided that an adequate lead time is allowed for administrative changes.⁴⁹

Concentration of administrative efforts is justifiable on revenue productivity grounds. In many developing countries, a small percentage, say 5 percent to 10 percent, of potential taxpayers account for about 80 percent to 90 percent of total revenue collected from major taxes, that is, business income taxes and sales taxes. Concentration of administrative resources on large taxpayers would be productive,⁵⁰ while the diversion of staff time and materials beyond a reasonable level on small taxpayers and hard-to-tax groups would yield little revenue. Efforts to tax these taxpayers, however, may still be justified on equity grounds, as well as on the possibility of obtaining information related to large taxpayers for auditing purposes. But it must be recognized that this represents a short-term expedient that should not become a permanent feature of the tax system. In the short term, as it is often difficult to ascertain the taxable bases of small taxpayers, presumptive taxation can be used as a tax policy instrument to bring them into the tax net. Nevertheless, the objective should be to bring them into the universe of regular taxpayers over time.

Minimum business taxes can also be levied on business profits of medium- and large-size enterprises effectively in developing countries to remedy the following three major problems of net profit taxation: (1) low level of compliance by taxpayers; (2) poor state of enforcement by tax administration; and (3) large-scale use of tax incentives by new enterprises as opposed to those which do not benefit from such schemes. Minimum taxes are even used in developed countries such as Canada, Denmark, Norway, and the United States to enhance the equity and efficiency of income taxes. They are also convenient for assessment and collection purposes by the tax administration. Minimum taxes are payable on a current basis, and are credited against the final tax levied on net profits, but no refund is allowed if the former is higher than the latter.⁵¹

⁴⁸Exemption of the agricultural sector in VAT in most countries, including Western Europe, is an indication of this trend.

⁴⁹See Bahl and Martinez-Vasquez (1992).

⁵⁰See Casanegra de Jantscher and Bird (1992).

⁵¹For a more detailed discussion of presumptive taxation and minimum taxes, see earlier sections of this chapter.

⁴⁵See Oldman and Bird (1977).

⁴⁶Experience has shown this resulted in several countries, namely Argentina, Morocco, Senegal, Tunisia, and Turkey.

⁴⁷See Sicat (1990).

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VII

TAX REFORM AND IMF TAX

POLICY ADVICE

Tax Reform in Market Economies and Economies in Transition: Principles and Experience

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- *What have been the principles of tax reform in market versus transitional economies, in particular as these relate to the role of the state and that of taxation as an instrument of policy?*
- *How does recent experience in tax reform—widening of tax bases and lowering of tax rates—in market economies compare with that of gradual movement away from exclusive reliance on wage withholding and turnover taxes in transition economies?*
- *Should tax reform in transitional economies employ the gradual versus “big bang” approaches?*

The dramatic recent political and economic disintegration of the centrally planned economies of Eastern Europe and the former Soviet Union points to the importance of examining, *inter alia*, the economic reform issues that have arisen, while at the same time highlighting the direction and sequencing of prospective reform, as these economies undergo economic transition into market economies. An important subset of issues relates to tax reform considerations and, in particular, the insights that may be drawn from the experiences of market economies, not only to Continental Europe but also to East Asia and Latin America. These will be illustrated in this section using a stylized approach reflecting standard characteristics, which contrasts for the two broad groups the role of tax policy, their recent experiences with reform, and the directions of prospective reform in transition economies. The latter aspect presents special difficulty when dealing with transitional economies because experience is limited and because, for tax reform to be fully effective, it must emerge as a natural outgrowth of, rather than anticipating, more wide-ranging economic policy and structural reform.

Role of Tax Policy

In *market economies*, the roles of tax and fiscal policies follow from the view of the role of government in organizing economic activities. The earlier view of an activist role for governments appears to be giving way to a more restrictive view that in a market economy, governments exist essentially to promote the develop-

ment and efficient functioning of market forces over the longer term.¹ In this context, “tax neutrality” has been invoked by fiscal experts as the prime guide for a tax system designed to work with market forces. Where, however, “market failure” is manifested because of public goods, externalities, natural monopoly, and asymmetric information, state intervention is observed to be warranted. In these cases, however, the state is called upon to facilitate the provision of, rather than to produce, such goods and services, thus necessitating an explicit transfer of financing resources between the private and the public sectors. It is this limiting view of the financing role of government emanating from both the tax and expenditure sides of the budget which helps to support a restrictive view of the desirable tax burden. Hand in hand with this shorter-term revenue-enhancing role of tax policy is its perceived contribution to short-term economic stabilization. This older Keynesian view of taxes, however, particularly as automatic stabilizers, has given way, because of the shorter lags to a greater emphasis on stabilization through monetary policy instruments. There remain, however, recognized longer-term functions for the tax system represented by its allocative function, primarily in influencing the aggregate consumption/investment resource balance through tax/price wedges and, to a lesser extent, its redistributive function in reducing socially skewed distributions of income and wealth. A more recently emerging role for tax systems—at least in some industrial countries—is through adjustment of energy taxes to reflect environmental concerns. This is discussed more fully in Chapter III. In the last analysis, however, the need to finance burgeoning government expenditure without recourse to inflationary bank financing or augmenting the government debt burden means that, in the short term, the revenue-enhancing objective is more important than other objectives.

By contrast, in *economies in transition* from central planning, the role of taxation hovers uneasily between its former function as a passive system of predetermined transfers and a more modern role as an instrument of macroeconomic policy that influences the behavior of economic agents.² The public sector still

¹See OECD (1993).

²See Tanzi (1992).

effectively covers virtually the whole economy, and enterprise activity and employment are largely public in character, with output and prices at both the sectoral and individual firm level only gradually being freed from centralized controls. In this system, taxation of employees has taken the form of withholding taxes on individual earnings, and of payroll-based social security contributions, in a controlled wage-setting environment. For enterprises, a system of regulated volume, price and profit differentials operate, with the result that no tax laws had to be legislated and that a wide variety of arbitrarily established nominal—and more importantly effective—tax rates operated in practice. There was thus no room for unplanned explicit taxation, although implicit taxation probably existed to the extent that planned product prices did not match actual factor payments and other operating costs.³ In place of compulsory explicit transfers between the private and public sectors through taxation, as in market economies, there was a centralization of revenue and its subsequent allocation or earmarking through transfers to other levels of government and to state enterprises—in essence, a process of cash management based on priorities established under a central plan and modified from time to time. Moreover, other state-controlled subsystems (e.g., monetary, wage setting, prices) also carried out quasi-taxation functions. In addition, the operations of this all-encompassing public sector were also financed through credit obtained on easy terms from the state-controlled banking sector.

Recent Experiences in Tax Reform

• *Market economies.* The recent evolution of the structure of the tax system in *market economies* reflects a fundamental shift in taxation philosophy away from interpersonal equity objectives and toward economic efficiency objectives. Efficiency is best secured when it can be established for both taxpayers and tax administrations with certainty and transparency. Thus, in forcing transfer of resources through taxation, the thrust has been to produce lower burdens or deadweight losses. Against this background, there has evolved, over several decades, a complex system of *ad personam* direct taxes on income and wealth focusing on considerations of horizontal/vertical equity and redistribution, and *ad rem* indirect taxes (notably the sales tax, VAT, and selected excises) which, although possibly regressive in their effects, do implicitly favor savings and investment. As one might expect, tax reform in advanced market economies has at least in spirit forsaken efficiency optimization in a narrow technical

sense for administrative feasibility in developing tax systems that foster compliance and reduce disincentives to private sector investment. Tax systems reflecting such overall features have been broadly evolving in OECD countries, East Asian economies, as well as Latin American countries.^{4,5}

The *personal income tax* has remained, for most Western countries, the tax choice because of its imposition of a tax burden in line with the individual's ability to pay, although they have recognized that effective progressivity depends not only on the rate schedule but also on the comprehensiveness of the tax base. This has led to a movement from a schedular system with income differentiation by source and a rate structure associated with each source, toward a global system based on aggregating income from all sources (including fringe or noncash benefits from employment, and also short-term capital gains) and a progressive marginal rate structure. At the same time, considerations of supply-side gains and administrative simplicity have brought about a flattening in rate structures, representing a substitution of linearity based on horizontal equity for progressivity based on vertical equity. This has taken the form of a lesser number of rates; in addition, there has been a significant reduction in the top marginal rate so as to align it more closely with the corporate rate and thereby reduce its disincentive effects and the associated scope for tax avoidance. Contemporaneously, and to sustain revenue yield, the tax base has been broadened by eliminating built-in erosions and rationalizing personal exemption limits in relation to per capita GDP or by family size based on notions of minimum income levels. Finally, to make tax administration more simple and selective, there has been an extension of withholding taxes as final taxes beyond wages to investment income.

In the *corporate tax* area, reform has taken the form of stressing the importance of an objective definition of profits based on generally accepted accounting principles but taking account of inflation in the valuation of assets and their amortization, and permitting carryforward of losses. There is general agreement on a low, single, tax rate, aligned to the top marginal rate of personal income tax. While some countries, notably the United States and Japan where public companies are more common, still maintain classically oriented corporate tax systems that delink the taxation of corporations and their shareholders, the general drift has been toward the full integration of corporate and personal income tax.

³See Tanzi (1991).

⁴See Shome (1992).

⁵See Tanzi and Shome (1992).

Such integration could be achieved through exemption of distributions from corporate tax in favor of taxing distributions on a gross basis at the shareholder level; alternatively, distributions could be taxed gross at the corporate level, and on a grossed-up basis at shareholder levels but with full imputation or tax credit against shareholder liability for the corporate tax levied thereon. Increasingly, considerations of world efficiency and capital export neutrality have led to the adoption of the full imputation approach, and even "tax sparing," within the framework of double taxation conventions. These considerations have also contributed to the view that at the margin, a single low statutory tax rate and other noneconomic factors (e.g., political stability, good infrastructure, a lower-paid but educated work force) are more important elements in reducing the risk premium for the prospective foreign investor than taxation by itself.

There has been a structural shift in tax structures, with increasing shares for taxes on consumption relative to taxes on income and wealth. With the notable exceptions of the United States, which does not have it, and Japan, which has a different production-based variant, it has been generally recognized that a consumption-type, destination-based, invoice-backed VAT represents the best general tax on consumption for market economies. In this form, only minimal tax base exemptions (e.g., health, financial services, and owner-occupied housing, and, perhaps, some professional services) are retained based on administrative considerations; tax is levied at a single rate; and there is provision for zero-rating of exports and taxation of imports. This is because of its positive revenue and neutrality/efficiency characteristics, although it could be adverse in its redistributive consequences. To mitigate these regressive effects, countries (especially in Western Europe) have attempted to provide substantial tax base exemptions and/or differentiated tax rates for essential and nonessential foodstuffs and other consumption items. VAT systems have been reinforced for sumptuary consumption items (e.g., alcohol, tobacco, and transport and petroleum products) by prior ad valorem excise duties, which, being price inelastic, generate stable revenue. The structural shift mentioned above is especially visible as regards external trade taxes, which are no longer viewed as revenue "handles" and, indeed, even as instruments of effective protection. Rather, the modern view accepts the need to accommodate some protectionist pressure while securing minimum revenue, by adopting a low uniform tariff supplemented by border tax adjustments to eliminate/reduce tariff costs for exported products.

Finally, taxation in advanced market economies has been carried out in the presence of an evolving environment characterized by an open relationship between taxpayers representing the private sector and the tax administrations representing the public sector, based on a mutual recognition of their respective rights and duties. It reflects a clear acceptance by governments that complex tax systems function effectively only if large segments of the population respect and comply with their obligations under the tax code. For their part, taxpayers have tacitly accepted their compliance obligations of filing tax returns, paying their tax liabilities, and responding to requests for information from tax administrations in a timely fashion. In turn, tax administrations have learned to respect the rights of taxpayers to be informed, assisted, and heard; to receive fair treatment; to have all their matters treated with confidentiality; to have their tax liabilities determined with certainty; and to be able to appeal freely against administrative decisions before independent administrative tribunals and/or the courts.

▪ *Centrally planned economies.* The basic forms of taxation in formerly centrally planned economies (in order of importance) included various individual levies on enterprises, turnover taxes, payroll taxes, and wage taxes. Enterprise taxes were essentially levies that were presumptive in character, because they were negotiated for each enterprise in terms of its production and distribution expenses rather than as a predetermined share of operational profits established by using objective accounting indicators. Such levies related to, inter alia, the enterprise's use of resources, rents, amortization funds, and wage levels. Enterprises were also subject to turnover taxes, again established on an individual enterprise basis, levied on a tax base as a percentage of retail prices that represented the difference between planned levels of producers' costs and retail prices. Because retail prices were fixed while costs varied, this produced multiple effective tax rates but insignificant cascading and avoidance of tax charged. One factor increasing the price of labor as a production input was payroll taxes (including social security contributions) levied at a proportional rate on the gross wage bill. By contrast, workers paid a withholding wages tax at a proportional rate as a final tax on their earnings adjusted for family size. Taxes on foreign trade, together with quantitative restrictions, were designed to capture foreign exchange earnings and to insulate the domestic economy from foreign influences. Finally, although interest on deposits with state banks was not taxable, the state collected specific service fees and charges.

One important distinguishing characteristic of transitional economies was the very marginal function performed by *tax administration*, reflecting the implications of dominant state ownership and control of economic activities. Thus, the tax administration was not engaged in the traditional functions of assessment, collection and enforcement of taxes. Assessment was essentially plan-determined, with no scope for appeal. Collection took place through transfers between accounts held with the state banking sector. Enforcement through general or selective audits, fines, and penalties was virtually nonexistent because most tax revenue was obtained through a few taxes only, paid compulsorily in one form or another by a relatively small number of state enterprises. As a result, the role of the tax administration was limited to merely verifying the arithmetical correctness of tax-based transfers between bank accounts.

Prospects for Tax Reform in Transitional Economies

All transitional economies have accepted the need for a fundamental restructuring of their tax systems as they evolve from being controlled economies to becoming market economies. This restructuring is necessary to take account of the microeconomic efficiency effects of taxation applied to newly independent economic agents. Also, in the short run, macroeconomic considerations call for maintaining fiscal stability in the face of contracting tax bases and rising demands for significant social welfare and public infrastructural outlays. Moreover, the opening of the economy to the outside world brings in its wake an increased domestic susceptibility to external economic developments.

While tax reform in transitional economies to be effective cannot be long delayed, it also cannot precede underlying structural change. The central dilemmas for policymakers are how to balance longer-term concerns of equity and allocative efficiency with the shorter-term concern with declining revenue, and whether to

go for a "big bang" comprehensive approach in adopting a Western-type tax structure or to proceed more gradually. In practice, they have adopted elements of both approaches, in the process saddling themselves with complex distortionary features.⁶ Experience in East Germany in bringing its tax system more in line with that of West Germany, and of reforming tax systems in other East European economies has shown that significant adjustments become much more difficult to implement in the second round as opposition to them builds up. Moreover, the economies in Eastern Europe are recognizing after more than a decade that reformed tax systems are difficult to legislate, and once legislated, even more difficult to implement unless complemented by institutional, administrative (including legal), and attitudinal changes within the tax administration and taxpayers. The Baltic countries (Estonia, Latvia, and Lithuania) have formally introduced Western-based tax systems by decree in 1991/92, but their implementation is proceeding very slowly.

The overall record in transition economies is, at best, mixed. Their VAT systems remain complicated to operate because of the retention in the CIS countries of the origin principle and a cash rather than accruals basis of assessment; multiple rates; excessive exemptions; and mixes of invoice- and accounts-based methods of establishing tax liabilities. Similar multiple rates and excessive exemptions, especially for agriculture, characterize the schedular personal income tax and profits taxes. Land taxes remain primitive, in part reflecting the uncertain situation regarding land titles and thus land values.

Clearly, the normally difficult and drawn out process of tax reform is likely to prove even more so in transition economies. While legislation can often be put in place by fiat, for a modern tax system to take root requires a structural sea change of institutions, laws, procedures and, not least, in the thinking of tax authorities and taxpayers.

⁶See Shome and Escolano (1994).

Summary of IMF Tax Policy Advice

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- *What are standard IMF recommendations on tax policy?*
- *What elements are common to all countries and what elements are unique to specific countries?*

The Fiscal Affairs Department (FAD) of the IMF has offered advice on tax policy to many countries. This chapter provides an account of the nature and scope of recent IMF advice given to countries in response to their requests for technical assistance on tax policy. It identifies in this advice both common themes applicable to all countries and special elements designed to address issues unique to a specific country or countries.⁷

Reforming the tax system in any country is a complicated undertaking, with its scope and direction frequently circumscribed by many political and economic factors. One unmistakable common goal of tax reform is the simplification of existing tax systems in recognition that overly complicated tax systems tend to generate inefficiencies, inequities, high compliance costs, and tax evasion. With the fundamental tenets of tax policy as described in this Handbook as a basis, the IMF has also advocated the need to enhance the neutrality of the tax system and to lessen the demands on tax administration. In general, the IMF has recommended achieving these goals through either the simplification of the structure of existing taxes or the introduction of new and simple taxes to replace old and complicated ones.

Many of the countries that seek advice are engaged in IMF structural adjustment programs. One critical component of many of these programs is the alleviation of fiscal imbalances that threaten macroeconomic stability. IMF advice has therefore frequently taken into account the need for additional revenues. It has been guided by the principle of designing tax policy measures that would generate adequate revenue to meet budgetary needs in as economically neutral a manner as possible. Nevertheless, in countries where revenue needs were particularly severe or where existing administrative capacities were seriously inadequate, the

IMF has also suggested interim measures that may deviate from the long-term goals of tax reform.

To illustrate patterns and trends in taxation, a data base on tax structure for IMF member countries is presented for 1975–1992 in the Appendix (Tables 1–36). Countries are grouped by geographic region and level of development into six country categories: OECD, African, non-OECD Asian, Middle Eastern, non-OECD Western Hemisphere, and Eastern European and transition economies.

The following section examines in greater detail the scope and nature of IMF advice on tax policy.

Nature and Scope of Recommendations

Overall tax revenue

Most countries rely on tax revenue as the main source of funding for the public sector. The size of the public sector—including social insurance—tends to be positively related to the per capita income of the country. Hence, the share of tax revenue in GDP also tends to increase with per capita income. The share of tax revenue in GDP is largest in OECD countries and is smaller in developing countries.⁸ In 1986–92, this share averaged 30.4 percent of GDP in the OECD countries, 17.7 percent of GDP in the African countries, 14.1 percent of GDP in the non-OECD Asian countries, 13.6 percent of GDP in the Middle Eastern countries, 16.5 percent of GDP in the non-OECD Western Hemisphere countries, and 27.3 percent of GDP in the transition economies (Tables 1–36 (in percent of GDP)).

Domestic consumption taxes

Domestic consumption taxes are a critical component of most tax systems. They comprised from 19.4 percent to 36.6 percent of tax revenues in the different regions of the world in that same period (Tables 1–36 (in percent of tax revenue)).

In most countries, the largest proportion of consumption tax revenues comes from broad-based sales, turnover, or value-added taxes. The overall objective of domestic consumption taxes is to tax the consumption of a broad base of goods and services at a low rate, so

⁷This discussion draws upon previous work of the Fiscal Affairs Department, including IMF, Tax Policy Division (1993), Tait (1989), Tanzi (1990), Shome (1993), Shome and Escolano (1993), and Shome (1995).

⁸For various discussions of tax revenue structures in a cross-section of countries, see Mendoza, Razin, and Tesar (1993), Sidgwick (1991), Tait, Grätz, and Eichengreen (1979), and Tanzi (1987).

that maximum revenue is obtained and the burden is widely spread. Efficiency is achieved through equal treatment of different sectors and activities.

Although many countries make use of multilevel turnover taxes, this results in cascading. Hence, these taxes are inferior to a VAT. Retail sales taxes avoid the problem of cascading but are more prone to tax evasion than a VAT. As a result, the VAT is a good tax.⁹ IMF advice in the area of domestic consumption taxes has generally focused on the VAT. The IMF has provided extensive assistance to countries engaged in both the introduction or restructuring of an existing VAT. Many countries have introduced a VAT in recent years (most notably in the transition economies). Other countries have reformed and simplified their existing VATs (most notably in the Western Hemisphere). In arriving at their recommendations, the IMF has frequently used the experience of the countries of the European Union (EU) as a guide.

The IMF has typically recommended that the VAT have a single rate within the range of 10 percent to 20 percent, depending on revenue needs (with a zero rate for exports) and that exemptions be kept to a minimum. In countries where a single-rate VAT seemed politically infeasible, the IMF has proposed a dual-rate structure (a normal rate coupled with a reduced rate on a limited number of items). FAD has argued strongly against the adoption of a VAT with more than three rates. FAD has also urged against taxing certain goods, principally necessities, at low rates or exempting them. It has favored redistributing income on the spending side rather than on the tax side.

As regards the base of the VAT, the IMF has focused on limiting the scope of exempted items to a few standard ones that are difficult to administer under a VAT, such as rental incomes from housing, financial services, and the agricultural sector, and on taxing all other goods and services, including construction materials, professional and personal services, sales of new buildings, and purchases by government, other public, and nonprofit entities. In selected transition economies, the IMF has departed from typical practice and recommended that the VAT be applied to farmers, because, compared to many countries, the farms are large and few in number.

In a few countries, the IMF has expressed a preference for taxing essential items at a reduced rate over exempting them, but if they were to remain untaxed, it recommended exemption rather than zero-rating. To promote capital formation, the IMF has uniformly rec-

ommended the adoption of a consumption-type VAT, although this narrows the base of the VAT relative to a gross- or net-income-type VAT. To maintain international competitiveness, the IMF has also recommended the adoption of a destination-based VAT. For interstate trade among the countries of the Commonwealth of Independent States (CIS), the IMF did not object to the adoption of an origin-based VAT, because of the absence of border controls and other administrative reasons.

The IMF has recommended that the VAT cover the manufacturing stage. In some countries with stronger administrative capacities, it has recommended that the VAT cover the retailing stage as well, with this as the ultimate goal in most countries since this results in the broadest and most efficient VAT. The IMF has been a firm advocate of using the invoice-credit method of accounting. It has frequently recommended that the VAT have a threshold level based on turnover for exempting small traders. This threshold eases the administrative burden with little loss of revenue. In some cases, this recommendation has been coupled with a provision for allowing small traders to opt into the VAT if they wish to credit VAT on their purchases.

The introduction of a VAT requires considerable effort in educating taxpayers and training tax administrators. For this reason, the IMF has sometimes recommended that countries first reform and improve the structure of turnover or sales taxes before introducing the VAT. The recommendations for reform of these taxes are similar to those for the VAT in that they have emphasized broadening the base and simplifying the rate structure.

The IMF has also offered considerable advice on reform of excise taxes, which most countries already have. Excises have many uses in a system of taxes, including revenue generation with little excess burden, correcting for negative externalities, and enhancing vertical equity. It has generally recommended a five-pronged strategy for excise tax reform: first, to limit the list of excisable goods to a few traditional ones, such as tobacco products, alcoholic and nonalcoholic beverages, and petroleum products (and perhaps vehicles and some luxury goods); second, to replace specific with ad valorem rates to prevent the erosion of revenue by inflation; third, to choose excise tax rates that are internationally comparable; fourth, to tax imports as well as domestic production so as not to disadvantage domestic production; and fifth, to levy VAT on the price inclusive of excises. The IMF has also at times recommended that countries maintain a combination of specific and ad valorem rates if tax administrative capacities are too weak to ensure that goods are val-

⁹See Tait (1988).

ued accurately and if the excises are intended to be externality-correcting.

International trade taxes

International trade taxes are generally a more important part of the tax system in developing countries than in industrialized countries. The lowest-income countries tend to rely most heavily on international trade taxes, primarily import taxes or duties. Trade taxes comprised only 2.5 percent of tax revenues in OECD countries and 9.3 percent of tax revenues in transition economies in 1986–92 while these taxes ranged from 24.9 percent to 36.6 percent of tax revenues in other regions during that period. Among developing economies, the transition economy countries were an exception, with a relatively low reliance on international trade taxes, reflecting their relative isolation until the past few years and the lack of customs administration.

The last two decades have witnessed many instances of successful growth strategies in developing countries. All of them involved the implementation of outward-oriented trade strategies—lowering trade barriers, removing disincentives to exports, and implementing currency convertibility. Among developing countries, those that have adopted strongly outward-oriented trade policies seem to have shown better economic performance than those whose policies were inward-oriented or only moderately outward-oriented.¹⁰

As a consequence, the IMF has generally advised against reliance on import and export taxes. With regard to import taxes, the IMF has acknowledged that there may be some role for temporary import taxes, primarily to provide protection to domestic infant or restructuring industries, and secondarily, to provide revenue. The IMF's recommendations have typically involved simplifying and rationalizing the structure of import taxes, eliminating ad hoc exemptions, setting a uniform minimum tax on all imports (often well below the existing rate), adopting ad valorem rates, and valuing imports on the basis of market-related exchange rates.

The IMF has strongly opposed reliance on export taxes since they are almost always shifted back to producers. It has viewed export taxes as having a limited role in generating revenue; proxying for an income tax on sectors, such as agriculture, that are difficult to tax; and capturing windfall gains, usually on oil or extractive minerals. Often, export taxes are present in the form of implicit taxes. The IMF has strongly advocated the elimination of implicit taxation on trade through

nonmarket-related or multiple exchange rates, marketing boards that set below market prices, or surrender requirements on hard currencies. The IMF has also discouraged export subsidies.

Income taxes

Income taxes are a critical component of tax revenues in all regions of the world, ranging from 23.0 percent to 36.5 percent of tax revenues, in 1986–92 (see Appendix tables). Most countries levy both personal and corporate income taxes, although the breakdown between them varies across countries.

Personal income taxes are the mainstay of tax revenues in industrialized countries, while they are considerably less important in developing countries. Personal income taxes are a valuable component of a balanced tax system; nevertheless, they require greater tax administrative capacity than is found in many developing countries.

The IMF's recommendations with regard to the reform of personal income taxes have generally been in line with recent international trends in personal income tax reform. These reforms have emphasized reducing the graduation of the marginal rate schedule and broadening the base by limiting deductions, exemptions, and other tax preferences. The IMF has typically recommended a structure with no more than three brackets, with a top marginal tax rate of no more than 40 percent. Along with changes in the rate structure, the IMF has in many instances advocated raising the threshold for incurring a tax liability (i.e., standard deduction) to remove lower-income taxpayers from the tax rolls, to enhance the progressivity of the tax with little loss in tax revenue and simplified administration. In other instances, it has advocated lowering the threshold, especially in Western Hemisphere countries, to expand the base. It has also recommended limiting deductible items, such as the number of dependents, mortgage interest and other consumer interest payments, insurance and pension contributions, savings, and charitable contributions. It has also advocated limiting income exempted from the tax, such as certain income transfers and interest earned on government debt. The IMF has also in many cases recommended reforms to make the tax system neutral to inflation, by indexing brackets, credits, standard deductions, and other nominal amounts to inflation.

The IMF has typically favored the adoption of a global income tax to achieve equity goals; nevertheless, it has at times favored the retention of schedular income taxation in economies in which tax administration is weak and taxpayers tend to earn income from only one source. In countries with a schedular income tax-

¹⁰ See International Monetary Fund (1993).

tion, the IMF has advocated unifying the schedules that apply to different kinds of income so as not to distort incentives and generate inequities. Although the choice of filing unit is an important issue, the IMF has tended not to recommend changes in prevailing practices.

Corporate taxes are a mainstay of the tax system in many countries, though they typically constitute a larger share of tax revenue in developing countries than in industrialized countries. Nevertheless, their complexity in industrialized countries has made them an important focus of tax reform efforts, even though their revenue yield is modest.

The IMF has generally emphasized the importance of adopting a single, proportional rate for the corporate income tax, typically within the range of 30–40 percent (higher in some regions as revenue needs demand) to enhance the efficient allocation of capital. It has frowned upon graduated marginal tax rate schedules for the corporate tax as a means to increase the progressivity of the corporate income tax. Moreover, it has frequently recommended that personal and corporate income taxes have the same top marginal rate to prevent tax avoidance through the choice of corporate or noncorporate form.

The IMF maintains a widely held view that tax incentives of all sorts have proved to be largely ineffective, while causing serious distortions and inequities in corporate taxation. The IMF has recommended broadening the base of the corporate income tax by eliminating sector- or activity-specific tax incentives in the form of tax deferrals or tax exclusions. The IMF has also typically recommended that all domestic enterprises, including state and private ones, receive uniform treatment under the corporate income tax. In most cases, it has advocated uniform treatment of domestic and foreign enterprises. Nevertheless, leveling the playing field has proved to be one of the most intractable corporate income tax problems.

The IMF has recommended the need to base income on an accruals basis. It has also recommended the adoption of clear rules on deductible costs. It has advised that deductible costs be limited to direct business costs, instead of including charitable contributions, payments-in-kind to workers, and other ancillary costs. It has also recommended limiting deductions on borrowed capital to short-term and long-term interest, but not including debt amortization, since this results in a double deduction for capital costs. The IMF has advocated rationalizing the treatment of capital by formulating simple depreciation rules. At times, it has suggested using accelerated depreciation as an alterna-

tive to other forms of tax preferences or as an offset to high rates of inflation. It has also recommended rationalizing inventory valuation and loss carryforward rules. In economies beset by high inflation, as in some Western Hemisphere economies during the 1970s and 1980s, and the transition economies, the IMF has advocated indexation of taxable income and revaluation of assets and liabilities. The IMF has also in some countries focused on taxation of the financial and minerals extraction sectors, since there are many special tax issues relevant to them.

The IMF has also advocated the use of a minimum corporate tax in economies where corporate tax revenues have been seriously eroded as a result of various factors, including political forces that have led to excessive issuance of tax preferences, high inflation combined with large nominal interest deductions, and high rates of tax evasion. The most common recommendation is for a minimum tax on assets, defined variously as gross, net, or fixed assets, as in some Western Hemisphere and other countries. An alternative is a minimum tax on turnover or gross receipts, as recommended in several Middle Eastern and African countries.

Capital gains taxation is an issue relevant to both personal and corporate income taxes. The IMF has taken different views on this issue, in some cases recommending that capital gains be taxed as regular income, and in other cases, that they receive preferential treatment. This ambiguity in IMF advice reflects the general uncertainty in the economic profession as to the effect of capital gains taxes on capital formation and economic growth. In a few anglophone African countries, the IMF has favored taxing only the real portion of capital gains.

Other taxes

Payroll taxes are generally much simpler than income taxes. IMF recommendations in this area have generally focused on broadening the base to include all forms of compensation, including in-kind compensation, when this is feasible; maintaining a simple rate schedule; and choosing rates that are internationally comparable.

The IMF has dealt less extensively in the area of wealth-related taxes since these raise relatively little revenue as a proportion of overall tax revenues. Nevertheless, in many countries, taxes on property and land may be important, particularly for financing local public services. The IMF has recommended reforming these taxes by instituting regular revaluation of property or adjustments in the tax rate so as to maintain their yield in inflationary economies.

The IMF has also dealt with a variety of smaller taxes and taxes that are specific to certain countries or regions. In transition economies, one component of the enterprise income tax (i.e., the corporate income tax) is often a tax on excess wages. The IMF has advised against using this form of tax, while acknowledging it may have some role to play in public enterprises in the short run since, in the absence of competitive markets, it may prevent managers from paying workers

excessive compensation. The IMF has also recommended the elimination of a variety of small, nuisance taxes that yield little revenue but require substantial resources to administer. In Western Hemisphere countries with serious environmental problems, the IMF has encouraged consideration of environmental taxes, such as a carbon tax on emissions, and a tax on the use of certain natural resources.

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APPENDIX

Summary Tax Structure Tables, 1975–92

ASEGEDECH WOLDEMARIAM

The attached tables contain cross-country statistical information on tax revenues for IMF member countries for which data are available. The data, which cover 1975–92, are organized by major regional groupings.¹

The main sources of the data are the IMF's *Government Finance Statistics* (GFS) and *International Financial Statistics* (IFS) in the IMF Data Fund. Since there are no data available in the same sources for the former Soviet Union (FSU) countries, data from the *Economic Reviews* of the FSU countries and from the recent IFS supplement on these countries have been used.

To maintain consistency of measurement and to allow cross-country comparisons between tax structures, the tables show consolidated central government revenue for most of the countries; however, budgetary central government revenue was used for countries for which the former was not available. The *central government*, as defined in *A Manual of Government Finance Statistics*, includes "all governmental departments, offices, establishments, and other bodies which are agencies or instruments of the central authority of a country. Also included within central government are departmental enterprises attached thereto, relevant nonprofit organizations, and the geographical extensions of central government authority which may operate at the regional or local level without the attributes necessary for existence as a separate government." These units may be either budgetary, which means they are covered by the budget of the central government, or extrabudgetary, which means that they have their own budget and account.

The definitions of the various taxes in the tables are the same as those in the GFS manual.²

To facilitate comparisons, the information on revenues and their components is presented in the form of *ratios*. These ratios are calculated as *a percent of gross domestic product* (GDP) and as *a percent of total tax revenue*. GDP data are taken directly from the IFS for most country groupings or from the *Economic Reviews*

and the recent IFS supplement for FSU countries. Further, average figures refer to unweighted averages.

To even out annual fluctuations, the figures are averaged over 1975–80, 1981–85, and 1986–92. In some cases, however, data problems still remain. In cases where data are missing for some countries, figures in the tables show averages for the periods for which data are available. The specific years covered for every country are indicated in the column entitled "Sample Size."³

Moreover, for particular categories of taxes—income, consumption, and international taxes—the total collection as well as selected subcomponents are shown. The subcomponents that are presented in the tables are not exhaustive. Consequently, the sum of the subcomponents may be lower than the total. Thus, for instance, while The Bahamas shows a positive amount for "domestic taxes on goods and services" (Tables 25–30), the subcomponents "general sales, turnover, or VAT" and "excises" are both zero or almost zero. This is because most of the revenue from domestic consumption taxes is derived in the form of "taxes on specific services" (e.g., casino tax) and "taxes on use of goods or on permission to use goods or to perform activities" (e.g., motor vehicle taxes) which constitute subcategories not shown in the table. In some cases, because the data have been rounded to the nearest decimal point, the sum of the subcomponents may be greater than the total. For example, this is the case for "international trade taxes" for Austria in Table 4 and for Brazil in Table 29. Also, a figure of zero may reflect rounding of small amounts.

A further cause of divergence between an aggregate category and its subcomponents is the existence of unallocated revenue. In some instances, a substantial fraction of the revenue pertaining to a given category (e.g., "taxes on income, profits, and capital gains") is reported as "unallocated" in the original sources, rather than classified in the corresponding subcategories (e.g., "individual" or "corporate"). In these cases, to maintain consistency and preserve potentially valuable information, the classification based on the original

¹The aggregate tables represent the most recent data available from the IMF Data Fund and IMF publications.

²In most instances, the tables followed the classification scheme used in the data sources. Since much of the tax revenue data came from the GFS, these adhered most closely to the classification scheme outlined in *A Manual on Government Finance Statistics*.

³The sample size for a given country in calculating specific revenue ratios in percent of total tax revenue may be different from that in calculating specific revenue ratios in percent of GDP.

sources is retained. This, for example, is the case of Panama in Table 27.

The tables are classified as follows:

OECD countries:

Table 1. Tax Structure, 1975–80—Percent of GDP

Table 2. Tax Structure, 1975–80—Percent of Total Tax Revenue

Table 3. Tax Structure, 1981–85—Percent of GDP

Table 4. Tax Structure, 1981–85—Percent of Total Tax Revenue

Table 5. Tax Structure, 1986–92—Percent of GDP

Table 6. Tax Structure, 1986–92—Percent of Total Tax Revenue

African countries:

Table 7. Tax Structure, 1975–80—Percent of GDP

Table 8. Tax Structure, 1975–80—Percent of Total Tax Revenue

Table 9. Tax Structure, 1981–85—Percent of GDP

Table 10. Tax Structure, 1981–85—Percent of Total Tax Revenue

Table 11. Tax Structure, 1986–92—Percent of GDP

Table 12. Tax Structure, 1986–92—Percent of Total Tax Revenue

Non-OECD Asian countries:

Table 13. Tax Structure, 1975–80—Percent of GDP

Table 14. Tax Structure, 1975–80—Percent of Total Tax Revenue

Table 15. Tax Structure, 1981–85—Percent of GDP

Table 16. Tax Structure, 1981–85—Percent of Total Tax Revenue

Table 17. Tax Structure, 1986–92—Percent of GDP

Table 18. Tax Structure, 1986–92—Percent of Total Tax Revenue

Middle Eastern countries:

Table 19. Tax Structure, 1975–80—Percent of GDP

Table 20. Tax Structure, 1975–80—Percent of Total Tax Revenue

Table 21. Tax Structure, 1981–85—Percent of GDP

Table 22. Tax Structure, 1981–85—Percent of Total Tax Revenue

Table 23. Tax Structure, 1986–92—Percent of GDP

Table 24. Tax Structure, 1986–92—Percent of Total Tax Revenue

Non-OECD Western Hemisphere countries:

Table 25. Tax Structure, 1975–80—Percent of GDP

Table 26. Tax Structure, 1975–80—Percent of Total Tax Revenue

Table 27. Tax Structure, 1981–85—Percent of GDP

Table 28. Tax Structure, 1981–85—Percent of Total Tax Revenue

Table 29. Tax Structure, 1986–92—Percent of GDP

Table 30. Tax Structure, 1986–92—Percent of Total Tax Revenue

Eastern Europe and Former Soviet Union countries:

Table 31. Tax Structure, 1975–80—Percent of GDP

Table 32. Tax Structure, 1975–80—Percent of Total Tax Revenue

Table 33. Tax Structure, 1981–85—Percent of GDP

Table 34. Tax Structure, 1981–85—Percent of Total Tax Revenue

Table 35. Tax Structure, 1986–92—Percent of GDP

Table 36. Tax Structure, 1986–92—Percent of Total Tax Revenue

Table 1. OECD Countries: Tax Structure, 1975-80¹
(In percent of GDP)

	Sample Size	Domestic Taxes on Goods and Services										International Trade Taxes		
		Taxes on Income, Profits, and Capital Gains					Of which:					Of which:		
		Of which:					Social Security Taxes	Payroll Taxes	Total	General sales, turnover, or VAT	Excises	Of which:		
		Total	Individual	Corporate								Total	Import duties	Export duties
		Total Revenue	Tax Revenue	Other Revenue										Property Taxes
Australia	1975-80	23.2	20.7	2.5	14.5	11.4	2.9	0.0	0.0	4.8	1.6	3.1	1.2	0.1
Austria	1975-80	32.9	30.7	2.2	6.8	5.6	1.2	11.2	2.4	8.8	5.9	2.4	0.6	0.0
Belgium	1975-80	41.6	40.1	1.4	15.8	13.2	2.5	13.0	0.0	10.2	7.0	2.5	0.0	0.0
Canada	1975-80	18.4	16.0	2.3	9.7	6.7	2.7	2.0	0.0	2.9	1.9	0.9	1.1	0.3
Denmark	1975-80	33.7	30.2	3.5	12.9	11.7	1.2	0.6	0.0	15.5	8.5	4.5	0.1	0.0
Finland	1975-80	28.3	26.3	2.0	8.1	7.4	0.8	3.3	0.7	12.7	6.7	5.4	0.5	0.0
France	1975-80	36.9	34.9	2.0	6.5	4.4	2.0	15.4	0.4	11.9	8.7	2.4	0.0	0.0
Germany	1975-80	27.3	26.3	1.1	5.4	4.3	1.1	14.2	0.0	6.5	3.5	2.6	0.0	0.0
Greece	1975-80	29.4	26.6	2.8	4.5	3.1	1.2	7.4	0.1	10.0	4.9	3.7	1.5	0.0
Iceland	1975-80	27.0	23.9	3.1	2.6	2.1	0.6	1.1	1.3	12.5	8.4	1.7	5.6	0.0
Ireland	1975-80	33.7	30.1	3.6	10.8	9.2	1.6	4.5	0.0	10.5	5.4	4.5	3.7	0.0
Italy	1975-80	28.6	26.7	2.0	7.6	6.0	1.5	10.7	0.0	7.5	4.1	2.4	0.1	0.0
Japan	1975-80	10.5	10.1	0.4	7.3	3.9	3.3	0.0	0.0	2.4	0.0	1.9	0.3	0.0
Luxembourg	1975-80	47.6	42.6	5.0	18.2	12.0	5.8	13.5	0.0	8.6	5.0	3.2	0.0	0.0
Netherlands	1975-80	48.3	43.7	4.6	14.9	11.8	3.0	17.5	0.0	10.1	6.9	2.6	0.0	0.0
New Zealand	1975-80	32.9	29.4	3.5	21.7	18.5	3.2	0.0	0.0	6.0	2.8	2.7	1.1	0.0
Norway	1975-80	38.2	35.2	3.1	7.6	5.3	2.3	9.8	0.0	16.8	9.2	5.3	0.4	0.0
Portugal	1975-80	27.6	25.5	2.1	5.1	2.1	1.1	7.5	0.7	8.2	3.6	3.7	2.2	0.0
Spain	1975-80	22.6	20.7	1.9	4.7	3.0	1.6	10.6	0.0	3.3	0.8	1.5	1.9	0.0
Sweden	1975-80	35.5	31.0	4.5	7.4	6.4	1.0	10.6	1.8	10.2	5.8	3.6	0.5	0.0
Switzerland	1975-80	19.5	18.1	1.4	2.9	2.3	0.6	9.3	0.0	3.6	2.6	0.7	2.0	0.0
Turkey	1975-80	22.1	19.2	2.8	10.0	8.0	1.0	0.0	0.0	5.2	1.0	1.9	2.9	0.0
United Kingdom	1975-80	34.3	30.0	4.3	14.1	11.7	2.4	5.8	0.7	8.6	3.4	4.3	0.1	0.0
United States	1975-80	18.9	17.5	1.4	10.7	8.2	2.6	5.3	0.0	0.9	0.0	0.7	0.3	0.0
Unweighted average		30.0	27.3	2.6	9.6	7.4	2.0	7.2	0.3	8.2	4.5	2.8	1.1	0.0
														0.7

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 2. OECD Countries: Tax Structure, 1975-80¹
(In percent of total tax revenue)

	Sample Size	Domestic Taxes on Goods and Services										International Trade Taxes			
		Taxes on Income, Profits, and Capital Gains					Of which:					Of which:			
		Total			Of which:		Social Security Taxes	Payroll Taxes	Total	General sales, turnover, or VAT	Excises	Total	Import duties	Export duties	Property Taxes
		Total Revenue	Tax Revenue	Other Revenue	Individual	Corporate									
Australia	1975-80	111.9	100.0	11.9	70.0	55.1	13.9	0.0	0.2	23.0	7.9	15.0	6.2	5.7	0.6
Austria	1975-80	107.2	100.0	7.2	22.2	18.3	3.8	36.3	7.9	28.6	19.3	7.8	2.3	2.1	0.2
Belgium	1975-80	103.6	100.0	3.6	39.3	33.0	6.2	32.5	0.0	25.3	17.5	6.2	0.0	0.0	0.0
Canada	1975-80	114.7	100.0	14.7	60.6	41.9	17.1	12.4	0.0	18.2	12.0	5.9	8.6	6.8	1.9
Denmark	1975-80	111.5	100.0	11.5	42.8	38.8	4.0	2.1	0.0	51.3	28.2	14.8	0.3	0.3	0.0
Finland	1975-80	107.6	100.0	7.6	30.7	27.8	2.9	12.6	2.6	48.5	25.4	20.4	2.2	2.1	0.1
France	1975-80	105.8	100.0	5.8	18.6	12.7	5.8	44.1	1.3	34.1	24.8	6.8	0.0	0.0	0.0
Germany	1975-80	104.1	100.0	4.1	20.7	16.4	4.3	54.2	0.0	24.7	13.3	9.8	0.0	0.0	0.0
Greece	1975-80	110.5	100.0	10.5	17.0	11.5	4.6	27.8	0.2	37.7	18.4	14.0	5.7	5.7	0.0
Iceland	1975-80	113.0	100.0	13.0	11.1	8.6	2.5	4.5	5.3	52.3	35.0	7.1	23.3	22.3	0.1
Ireland	1975-80	112.0	100.0	12.0	35.8	30.6	5.2	15.0	0.0	34.8	17.9	14.9	12.1	12.1	0.0
Italy	1975-80	107.4	100.0	7.4	28.2	22.4	5.5	40.1	0.0	28.1	15.5	9.0	0.3	0.3	0.0
Japan	1975-80	104.0	100.0	4.0	72.0	39.1	32.9	0.0	0.0	23.6	0.0	18.5	2.9	2.8	0.0
Luxembourg	1975-80	111.8	100.0	11.8	42.7	28.2	13.6	31.7	0.0	20.3	11.7	7.5	0.0	0.0	0.0
Netherlands	1975-80	110.6	100.0	10.6	34.0	27.1	6.9	40.1	0.0	23.1	15.8	5.9	0.0	0.0	0.0
New Zealand	1975-80	111.7	100.0	11.7	73.8	62.6	10.8	0.0	0.0	20.5	9.5	9.1	3.8	3.5	0.1
Norway	1975-80	108.7	100.0	8.7	21.6	15.2	6.4	28.0	0.0	47.9	26.2	15.0	1.0	0.9	0.1
Portugal	1975-80	108.3	100.0	8.3	20.2	8.3	4.2	29.3	2.6	32.0	14.0	14.6	8.5	8.5	0.0
Spain	1975-80	109.5	100.0	9.5	22.5	14.5	7.9	51.0	0.0	15.9	4.0	7.2	9.5	9.5	0.0
Sweden	1975-80	114.6	100.0	14.6	24.0	20.7	3.2	34.1	5.8	33.1	18.6	11.8	1.6	1.6	0.0
Switzerland	1975-80	107.8	100.0	7.8	15.8	12.7	3.1	51.3	0.0	19.9	14.3	4.0	10.9	10.9	0.0
Turkey	1975-80	115.0	100.0	15.0	52.1	41.7	5.2	0.0	0.0	26.9	5.4	9.8	14.9	14.6	0.0
United Kingdom	1975-80	114.4	100.0	14.4	47.1	39.0	8.1	19.5	2.5	28.7	11.5	14.5	0.3	0.2	0.1
United States	1975-80	108.0	100.0	8.0	61.3	46.6	14.7	30.3	0.0	5.1	0.0	4.2	1.7	1.7	0.0
Unweighted average		109.7	100.0	9.7	36.8	28.0	8.0	24.9	1.2	29.3	15.3	10.6	4.8	4.7	0.1
															2.3

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 3. OECD Countries: Tax Structure, 1981-85¹
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Of which:		Total	Of which:				
					Individual	Corporate			General sales, turnover, or VAT	Excises		Import duties	Export duties			
														Property Taxes		
Australia	1981-85	25.0	22.4	2.6	15.2	12.4	2.6	0.0	0.0	5.8	1.8	4.0	1.3	1.2	0.0	0.1
Austria	1981-85	35.2	32.3	2.9	7.1	6.0	1.0	12.5	1.9	9.2	6.1	2.5	0.5	0.5	0.0	0.6
Belgium	1981-85	44.5	42.5	2.0	16.9	14.4	2.4	14.1	0.0	10.5	7.5	2.3	0.0	0.0	0.0	0.8
Canada	1981-85	19.4	16.8	2.6	9.4	7.2	2.0	2.5	0.0	3.9	1.7	2.1	1.0	0.9	0.1	0.0
Denmark	1981-85	37.3	32.4	4.9	13.2	11.5	1.5	1.5	0.1	16.3	9.9	4.2	0.0	0.0	0.0	1.1
Finland	1981-85	28.4	26.1	2.3	8.0	7.3	0.7	3.3	0.1	13.5	7.3	5.5	0.4	0.4	0.0	0.8
France	1981-85	41.2	37.7	3.4	7.3	5.2	2.1	17.0	0.5	12.2	8.9	2.3	0.0	0.0	0.0	0.7
Germany	1981-85	29.8	27.9	1.9	5.1	4.1	1.0	16.1	0.0	6.7	3.9	2.4	0.0	0.0	0.0	0.0
Greece	1981-85	34.2	31.3	3.0	6.0	4.4	1.0	11.2	0.1	11.8	6.5	4.3	0.5	0.5	0.0	0.7
Iceland	1981-85	26.9	23.1	3.7	2.6	2.0	0.6	1.0	1.1	12.7	8.2	2.5	4.5	4.2	0.0	1.1
Ireland	1981-85	40.8	35.9	4.8	13.1	11.4	1.6	5.5	0.6	12.6	7.4	4.5	3.5	3.5	0.0	0.6
Italy	1981-85	33.5	32.5	1.0	11.9	10.0	1.7	11.4	0.0	8.1	5.1	2.0	0.0	0.0	0.0	0.6
Japan	1981-85	12.3	11.6	0.7	8.3	4.7	3.5	0.0	0.0	2.4	0.0	1.9	0.2	0.2	0.0	0.4
Luxembourg	1981-85	50.7	44.3	6.3	18.5	12.8	5.3	12.3	0.0	10.9	5.8	4.6	0.0	0.0	0.0	2.5
Netherlands	1981-85	51.6	44.4	7.2	13.0	10.0	3.0	20.3	0.0	10.1	7.0	2.4	0.0	0.0	0.0	0.9
New Zealand	1981-85	35.2	31.1	4.1	22.5	19.8	2.5	0.0	0.0	6.7	3.8	2.4	1.4	1.3	0.0	0.3
Norway	1981-85	43.2	37.7	5.6	11.3	4.2	7.1	9.3	0.0	16.5	8.5	6.2	0.2	0.2	0.0	0.4
Portugal	1981-85	33.4	30.5	2.9	7.7	2.7	1.6	7.8	0.7	10.7	4.5	4.9	1.3	1.3	0.0	0.5
Spain	1981-85	25.6	23.0	2.6	5.7	4.5	1.2	11.5	0.0	4.0	1.4	1.0	1.1	1.1	0.0	0.7
Sweden	1981-85	38.5	32.7	5.9	6.2	5.0	0.9	12.7	1.8	11.1	6.4	3.9	0.3	0.3	0.0	0.5
Switzerland ²	1981-84, 81-85	20.0	18.9	1.1	3.0	2.4	0.5	9.8	0.0	3.9	2.9	0.7	1.6	1.6	0.0	0.6
Turkey	1981, 83-85	18.3	15.4	2.9	8.5	6.6	1.7	0.0	0.0	4.3	1.5	1.0	1.3	1.2	0.0	0.6
United Kingdom	1981-85	37.1	32.7	4.5	14.5	10.3	4.1	6.1	0.7	10.7	5.3	4.6	0.0	0.0	0.0	0.6
United States	1981-85	20.0	18.0	2.0	10.3	8.7	1.5	6.2	0.0	1.1	0.0	1.0	0.3	0.3	0.0	0.2
Unweighted average		32.6	29.2	3.4	10.2	7.8	2.1	8.0	0.3	9.0	5.1	3.0	0.8	0.8	0.0	0.6

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

²The sample period for "total revenue" is 1981-84; for all others, it is 1981-85.

Table 4. OECD Countries: Tax Structure, 1981-85¹
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Total	Payroll Taxes	Of which:		Total	Of which:				
					Individual	Corporate			Social Security Taxes	General sales, turnover, or VAT		Excises	Import duties	Export duties		
															Property Taxes	
Australia	1981-85	111.5	100.0	11.5	68.0	55.2	11.8	0.0	0.1	26.1	8.2	17.7	5.6	5.3	0.2	0.3
Austria	1981-85	109.0	100.0	9.0	22.1	18.7	3.2	38.8	6.0	28.6	18.9	7.8	1.5	1.5	0.1	1.8
Belgium	1981-85	104.7	100.0	4.7	39.9	34.0	5.7	33.3	0.0	24.8	17.6	5.3	0.0	0.0	0.0	2.0
Canada	1981-85	115.6	100.0	15.6	55.9	42.6	11.9	14.9	0.0	23.3	10.3	12.5	5.9	5.1	0.8	0.0
Denmark	1981-85	115.2	100.0	15.2	40.9	35.5	4.5	4.7	0.4	50.6	30.8	13.0	0.1	0.1	0.0	3.4
Finland	1981-85	108.8	100.0	8.8	30.6	27.8	2.8	12.6	0.2	51.8	28.0	21.1	1.4	1.4	0.0	3.2
France	1981-85	109.1	100.0	9.1	19.3	13.8	5.5	45.1	1.2	32.4	23.6	6.2	0.0	0.0	0.0	1.9
Germany	1981-85	106.7	100.0	6.7	18.3	14.6	3.7	57.7	0.0	23.8	13.8	8.6	0.0	0.0	0.0	0.1
Greece	1981-85	109.6	100.0	9.6	19.2	14.0	3.3	35.8	0.2	37.9	20.8	13.7	1.7	1.7	0.0	2.4
Iceland	1981-85	116.2	100.0	16.2	11.3	8.8	2.5	4.5	4.8	55.1	35.7	10.9	19.2	18.0	0.0	4.9
Ireland	1981-85	113.5	100.0	13.5	36.4	31.9	4.5	15.3	1.6	35.1	20.4	12.6	9.7	9.7	0.0	1.8
Italy	1981-85	103.0	100.0	3.0	36.6	30.8	5.3	35.0	0.0	25.1	15.7	6.1	0.0	0.0	0.0	1.7
Japan	1981-85	105.7	100.0	5.7	71.1	40.7	30.4	0.0	0.0	20.5	0.0	16.1	2.1	2.0	0.0	3.6
Luxembourg	1981-85	114.4	100.0	14.4	41.7	28.9	12.0	27.8	0.0	24.6	13.2	10.3	0.1	0.1	0.0	5.7
Netherlands	1981-85	116.1	100.0	16.1	29.2	22.5	6.7	45.7	0.0	22.7	15.8	5.4	0.0	0.0	0.0	2.0
New Zealand	1981-85	113.2	100.0	13.2	72.3	63.7	8.2	0.0	0.1	21.7	12.1	7.9	4.4	4.1	0.1	1.1
Norway	1981-85	114.8	100.0	14.8	29.9	11.1	18.8	24.6	0.0	43.7	22.6	16.6	0.6	0.6	0.0	1.0
Portugal	1981-85	109.5	100.0	9.5	25.0	9.0	5.2	25.6	2.4	34.9	14.7	16.1	4.2	4.2	0.0	1.7
Spain	1981-85	111.4	100.0	11.4	24.8	19.4	5.4	49.9	0.0	17.4	5.8	4.4	4.7	4.7	0.0	2.9
Sweden	1981-85	117.9	100.0	17.9	19.0	15.3	2.9	39.1	5.4	34.0	19.7	12.0	0.8	0.8	0.0	1.6
Switzerland ²	1981-84, 81-85	106.5	100.0	6.5	15.6	12.9	2.7	52.0	0.0	20.5	15.5	3.5	8.7	8.7	0.0	3.2
Turkey	1981, 84-85	118.6	100.0	18.6	54.8	42.4	11.0	0.0	0.0	27.9	10.5	6.3	8.6	8.3	0.0	3.7
United Kingdom	1981-85	113.7	100.0	13.7	44.2	31.7	12.6	18.8	2.2	32.8	16.2	14.0	0.1	0.1	0.0	1.9
United States	1981-85	111.2	100.0	11.2	57.0	48.4	8.5	34.4	0.0	6.0	0.0	5.4	1.6	1.6	0.0	1.1
Unweighted average		111.5	100.0	11.5	36.8	28.1	7.9	25.6	1.0	30.1	16.3	10.6	3.4	3.3	0.1	2.2

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

²The sample period for "total revenue" is 1981-84; for all others, it is 1981-85.

Table 5. OECD Countries: Tax Structure, 1986-92¹
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services				International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Total	Social Security Taxes	Payroll Taxes	Of which:		Total	Of which:			
								General sales, turnover, or VAT	Excises		Import duties	Export duties		
													Individual	Corporate
Australia	1986-91	26.5	23.7	2.8	16.5	13.2	3.0	5.8	2.4	3.3	1.1	1.1	0.0	0.1
Austria	1986-91	34.9	31.9	3.0	6.6	5.5	1.0	9.0	6.1	2.2	0.5	0.5	0.0	0.6
Belgium	1986-91	43.2	41.9	1.3	15.5	12.8	2.6	10.1	7.1	2.1	0.0	0.0	0.0	1.1
Canada	1986-88	19.9	17.6	2.3	10.3	8.1	2.0	3.6	2.5	1.1	0.8	0.8	0.0	0.0
Denmark	1986-91	40.7	35.0	5.7	15.3	12.1	1.8	16.7	10.0	4.3	0.0	0.0	0.0	1.1
Finland	1986-91	30.9	27.9	3.0	8.7	7.9	0.7	14.0	9.1	4.5	0.3	0.3	0.0	1.1
France	1986-92	40.8	37.8	3.0	7.2	5.0	2.1	11.6	8.2	2.5	0.0	0.0	0.0	0.9
Germany	1986-91	29.6	27.7	1.8	5.1	4.0	1.0	7.0	4.1	2.5	0.0	0.0	0.0	0.0
Greece	1986-90	35.9	32.7	3.2	6.9	4.6	1.7	14.6	8.8	5.1	0.0	0.0	0.0	1.5
Iceland	1986-91	27.9	24.6	3.3	4.2	3.5	0.7	13.6	10.3	0.9	3.0	2.8	0.0	1.4
Ireland	1986-90	38.9	35.7	3.2	13.9	12.4	1.5	12.2	7.7	3.5	3.0	3.0	0.0	0.7
Italy	1986-92	38.1	37.3	0.8	13.8	11.3	2.5	10.5	5.5	2.7	0.0	0.0	0.0	0.5
Japan	1986-89	13.7	12.9	0.8	9.3	4.9	4.4	2.0	0.0	1.8	0.2	0.2	0.0	0.9
Luxembourg	1986-91	49.5	44.7	4.9	17.1	11.3	5.3	11.6	6.7	4.4	0.0	0.0	0.0	3.3
Netherlands	1986-91	50.4	45.2	5.1	13.9	10.4	3.5	10.8	7.7	2.5	0.0	0.0	0.0	1.1
New Zealand	1986-88, 90-91	40.6	34.1	6.5	22.0	18.4	2.8	9.9	6.2	3.4	1.1	1.0	0.0	0.4
Norway	1986-90	46.1	36.9	9.1	7.7	4.6	3.1	17.4	9.3	6.1	0.2	0.2	0.0	0.5
Portugal	1986-90	35.0	32.1	2.9	7.4	3.8	2.2	13.1	6.6	5.2	0.9	0.9	0.0	0.3
Spain	1986-90	30.3	28.4	1.9	8.7	6.4	2.3	7.3	4.8	1.9	0.7	0.7	0.0	0.3
Sweden	1986-92	42.9	36.7	6.2	6.6	4.7	1.8	12.4	7.5	4.1	0.2	0.2	0.0	1.7
Switzerland	1986-91	...	19.7	...	3.2	2.6	0.6	4.0	3.1	0.6	1.4	1.4	0.0	0.8
Turkey	1986-90	18.3	15.2	3.0	7.7	5.6	2.1	5.7	4.1	0.4	1.2	1.2	0.0	0.0
United Kingdom	1986-91	36.2	32.6	3.6	14.0	10.1	3.9	11.0	6.1	4.1	0.0	0.0	0.0	1.4
United States	1986-92	19.7	18.0	1.6	10.1	8.3	1.8	0.7	0.0	0.6	0.3	0.3	0.0	0.2
Unweighted average		34.3	30.4	3.4	10.5	8.0	2.3	9.8	6.0	2.9	0.6	0.6	0.0	0.8

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 6. OECD Countries: Tax Structure, 1986-92¹
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes						
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		General sales, turnover, or VAT	Excises	Total	Of which:		Property Taxes
						Individual	Corporate				Import duties	Export duties						
Australia	1986-91	111.7	100.0	11.7	69.5	55.8	12.5	0.0	1.0	24.3	10.3	13.8	4.8	4.6	0.1	0.5		
Austria	1986-91	109.6	100.0	9.6	20.8	17.1	3.2	40.3	5.7	28.3	19.0	6.9	1.6	1.6	0.0	1.9		
Belgium	1986-91	103.1	100.0	3.1	36.9	30.4	6.2	36.3	0.0	24.2	16.9	5.0	0.0	0.0	0.0	2.6		
Canada	1986-89	113.1	100.0	13.1	58.7	46.3	11.1	16.1	0.0	20.8	14.2	5.9	4.4	4.4	0.0	0.0		
Denmark	1986-91	116.4	100.0	16.4	43.8	34.6	5.1	4.3	0.8	47.6	28.8	12.3	0.1	0.1	0.0	3.2		
Finland	1986-92	110.8	100.0	10.8	31.0	28.3	2.7	13.6	0.0	50.2	32.5	16.1	1.0	1.0	0.0	4.1		
France	1986-91	108.0	100.0	8.0	19.0	13.2	5.6	46.5	1.2	30.7	21.8	6.6	0.0	0.0	0.0	2.4		
Germany	1986-90	106.5	100.0	6.5	18.3	14.5	3.8	56.7	0.0	25.0	14.6	9.0	0.0	0.0	0.0	0.2		
Greece	1986-91	109.7	100.0	9.7	21.2	14.0	5.1	33.4	0.1	44.7	27.1	15.6	0.1	0.1	0.0	4.5		
Iceland	1986-92	113.5	100.0	13.5	16.7	13.8	2.8	6.0	3.7	55.4	41.9	3.7	12.4	11.4	0.0	5.6		
Ireland	1986-91	108.8	100.0	8.8	38.9	34.6	4.3	14.9	1.5	34.2	21.7	9.7	8.5	8.5	0.0	2.0		
Italy	1986-92	102.2	100.0	2.2	37.0	30.3	6.6	32.2	0.0	28.2	14.7	7.3	0.0	0.0	0.0	1.3		
Japan	1986-90	106.0	100.0	6.0	72.0	38.8	33.2	0.0	0.0	16.1	1.9	12.9	1.4	1.4	0.0	6.7		
Luxembourg	1986-91	110.9	100.0	10.9	38.4	25.3	11.9	27.5	0.0	26.0	15.1	9.7	0.0	0.0	0.0	7.4		
Netherlands	1986-91	111.1	100.0	11.1	30.9	23.3	7.6	42.2	0.0	23.9	16.8	5.6	0.0	0.0	0.0	2.4		
New Zealand	1986-88, 90-92	118.4	100.0	18.4	64.7	53.6	8.3	0.0	1.7	29.2	18.3	9.8	3.0	3.0	0.1	1.0		
Norway		1986-90	124.9	100.0	24.9	20.7	12.4	8.3	29.8	0.0	47.2	25.1	16.6	0.6	0.6	0.0	1.4	
Portugal		1986-90	110.0	100.0	10.0	23.1	11.8	6.7	29.0	0.0	41.0	20.4	16.3	2.7	2.7	0.0	0.8	
Spain		1986-90	106.6	100.0	6.6	30.5	22.4	8.0	40.3	0.0	25.7	16.7	6.5	2.5	2.5	0.0	1.0	
Sweden	1986-92	116.8	100.0	16.8	17.9	12.7	5.0	36.8	6.3	33.7	20.4	11.2	0.6	0.6	0.0	4.5		
Switzerland	1986-91	...	100.0	...	16.1	13.1	3.0	52.5	0.0	20.1	15.7	2.8	7.3	7.3	0.0	4.0		
Turkey	1986-92	119.8	100.0	19.8	50.4	38.2	12.2	0.0	0.0	38.4	28.1	3.7	7.2	7.2	0.0	0.3		
United Kingdom	1986-91	110.9	100.0	10.9	42.9	30.9	12.0	19.0	0.0	33.8	18.8	12.7	0.1	0.1	0.0	4.2		
United States	1986-92	109.1	100.0	9.1	55.9	46.1	9.8	37.4	0.0	3.9	0.0	3.2	1.8	1.7	0.0	1.0		
Unweighted average		111.2	100.0	11.2	36.5	27.6	8.1	25.6	0.9	31.4	19.2	9.3	2.5	2.5	0.0	2.6		

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 7. African Countries: Tax Structure, 1975-80
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services				International Trade Taxes						
		Total Revenue	Tax Revenue	Other Revenue	Of which:			Total	Of which:		Total	Of which:				
					Individual	Corporate	Social Security Taxes		Payroll Taxes	General sales, turnover, or VAT		Excises	Import duties	Export duties		
															Property Taxes	
Benin	1976-79	18.6	16.9	1.6	3.1	0.6	1.8	1.3	0.3	2.4	0.8	1.1	9.5	8.6	0.4	0.0
Botswana	1975-80	31.4	20.7	10.7	9.0	2.1	6.1	...	...	0.3	...	...	11.3	11.1	0.1	0.1
Burkina Faso	1975-80	13.9	12.7	1.2	2.1	1.4	0.5	0.8	0.2	2.6	1.0	0.8	6.7	5.9	0.5	0.2
Burundi	1975-80	13.5	12.8	0.7	2.4	1.0	1.3	0.1	0.1	2.6	...	2.5	6.4	3.3	3.1	0.7
Cameroon	1975-80	17.0	15.0	2.0	2.8	1.6	1.0	1.3	...	2.9	1.0	1.5	7.0	5.6	1.4	0.4
Central African Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chad	1975-76	9.4	8.4	1.0	1.6	...	0.7	...	0.2	1.3	0.8	0.3	4.7	4.0	0.7	0.1
Congo	1975-76, 80	33.8	23.5	10.4	11.1	1.9	8.4	0.5	0.7	4.6	4.2	0.3	6.1	6.0	0.1	0.2
Côte d'Ivoire	1979-80	24.0	21.1	2.9	3.0	1.4	1.4	1.3	0.8	5.7	2.2	1.9	9.8	7.4	2.4	0.5
Djibouti	1979-80	30.1	24.8	5.3	4.6	2.5	2.1	1.4	...	16.6	10.6	4.0	0.6	0.6	0.0	0.9
Ethiopia	1975-80	15.6	12.9	2.6	3.1	1.2	1.5	...	...	3.4	1.1	2.3	5.9	3.1	2.8	0.4
Gabon	1975-76, 80	33.8	23.0	10.7	13.3	0.7	12.2	0.3	0.3	1.7	1.5	0.0	7.0	6.2	0.7	0.0
Gambia	1975-80	18.9	15.2	3.7	2.5	1.0	1.4	...	0.1	0.6	...	0.2	11.9	10.1	1.8	...
Ghana	1975-80	10.3	9.3	1.0	2.0	1.0	1.1	...	0.0	2.5	0.5	1.9	4.7	1.6	3.1	0.0
Guinea	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenya	1975-80	19.8	17.3	2.5	6.4	1.7	...	...	...	6.7	4.4	1.9	4.0	3.9	0.1	0.0
Lesotho	1975-77	30.4	21.4	9.0	3.4	2.1	1.2	...	...	0.9	...	...	15.6	15.4	0.2	0.1
Liberia	1975-80	22.5	21.3	1.2	8.3	3.3	4.8	...	...	4.9	0.3	1.8	7.4	7.2	0.1	0.2
Madagascar	1978-80	24.8	17.4	7.4	2.8	1.6	1.2	2.2	...	6.8	3.9	1.9	5.2	4.5	0.7	0.3
Malawi	1975-80	17.0	14.2	2.8	6.3	2.2	4.2	...	...	4.8	3.7	0.7	3.1	3.1	...	0.0
Mali	1975-80	14.0	12.8	1.2	2.9	0.9	1.8	0.7	0.1	3.7	2.8	0.7	3.6	2.6	1.0	0.6
Mauritania	1975-79	22.5	16.2	6.2	4.4	3.6	0.7	1.2	0.0	4.3	3.3	0.7	6.0	5.7	0.1	0.2
Mauritius	1975-80	21.2	19.1	2.1	5.6	3.1	2.6	...	...	3.4	...	2.4	9.2	6.4	2.8	0.8
Morocco	1975-80	24.6	20.5	4.2	5.2	1.5	3.4	1.2	...	8.0	5.0	2.4	4.6	4.2	0.3	0.7
Niger	1976-80	11.2	11.2	0.0	3.6	0.7	2.5	0.5	0.0	2.5	1.6	0.8	4.4	3.8	0.6	0.3
Nigeria ¹	1975-78	19.6	17.3	2.3	13.6	0.0	13.6	...	...	0.5	...	0.5	3.2	3.2	0.0	...
Rwanda	1975-80	10.5	10.5	0.0	1.9	0.7	1.1	0.5	0.0	1.8	...	1.7	6.1	3.1	3.0	0.1
Senegal	1975, 77-80	19.9	18.5	1.4	4.1	1.8	1.7	0.2	0.1	5.0	2.4	2.2	8.3	7.7	0.7	0.6
Sierra Leone	1975-80	16.7	15.0	1.7	4.1	1.0	3.1	...	0.1	2.7	...	2.4	7.8	5.7	2.1	...
Somalia	1975-78	14.5	11.7	2.8	1.0	0.9	0.1	...	...	3.1	...	1.7	6.3	6.0	0.3	0.3
South Africa	1975-80	23.1	20.3	2.8	12.9	5.2	7.4	0.3	0.0	5.2	1.7	3.4	1.2	1.1	0.1	0.4
Sudan	1975-80	12.5	10.6	1.9	1.5	0.4	1.0	...	...	3.4	...	2.8	5.6	4.5	0.4	0.0
Swaziland	1975-80	34.7	32.1	2.6	10.0	3.6	5.7	...	...	0.9	...	...	20.9	15.5	5.4	0.1
Tanzania	1975-80	18.0	16.0	2.0	4.9	0.9	2.8	...	0.1	7.2	6.1	0.9	3.6	2.2	1.5	0.1
Togo	1977-80	30.2	26.8	3.4	10.3	1.4	8.2	1.9	...	4.3	3.1	0.9	9.9	7.0	1.4	0.3
Tunisia	1975-80	29.8	24.0	5.8	4.3	2.0	1.8	2.9	0.1	7.7	1.7	2.1	7.4	6.9	0.5	0.7
Uganda	1975-80	6.6	6.2	0.4	0.6	0.1	0.4	...	...	2.2	1.7	0.3	3.5	0.7	2.8	...
Zaire	1975-80	16.4	15.8	0.6	5.3	3.1	2.2	0.4	0.3	2.3	1.3	0.9	6.7	3.4	3.2	0.1
Zambia	1975-80	24.9	22.1	2.7	9.3	4.3	4.5	...	0.6	10.4	2.7	7.5	1.8	1.8	...	0.0
Zimbabwe	1976-80	23.9	19.7	4.2	11.7	5.5	5.7	...	...	6.8	5.1	1.5	1.0	1.0	...	0.1
Unweighted average		20.5	17.2	3.3	5.4	1.8	3.3	1.0	0.2	4.1	2.8	1.7	6.5	5.3	1.3	0.3

Sources: IMF, *Government Finance Statistics*; *International Financial Statistics*; and The World Bank, *World Tables 1993*.

¹Total revenue includes revenues collected for state and local governments.

Table 8. African Countries: Tax Structure, 1975-80
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Import duties	Export duties	Property Taxes
						Individual	Corporate				General sales, turnover, or VAT	Excises				
Benin	1976-79	109.8	100.0	9.8	18.0	3.3	10.5	8.0	1.8	13.9	4.7	6.6	56.4	51.1	2.4	0.3
Botswana	1975-80	153.0	100.0	53.0	44.4	10.3	30.0	...	...	1.5	...	...	53.5	52.7	0.8	0.5
Burkina Faso	1975-80	109.7	100.0	9.7	16.8	10.9	4.2	5.6	1.5	20.6	7.8	6.3	53.1	46.4	3.6	1.5
Burundi	1975-80	105.8	100.0	5.8	19.3	7.6	10.0	1.2	1.1	20.8	...	19.9	49.4	26.1	23.2	5.8
Cameroon	1975-80	114.2	100.0	14.2	18.5	10.5	6.9	8.6	...	19.7	6.9	10.2	46.5	36.9	9.4	2.7
Central African Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chad	1975-76	112.6	100.0	12.6	19.7	11.5	8.2	...	2.2	15.3	9.5	3.2	56.5	...	...	1.0
Congo	1975-76, 80	143.0	100.0	43.0	46.2	7.8	34.5	1.9	3.1	20.3	18.8	1.2	26.8	26.3	0.4	1.0
Côte d'Ivoire	1980	113.7	100.0	13.7	14.0	6.8	6.6	6.2	3.9	26.8	10.6	9.1	46.3	35.1	11.2	2.3
Djibouti	1979-80	122.1	100.0	22.1	18.8	10.3	8.6	5.2	...	67.0	42.9	15.9	2.7	...	...	3.7
Ethiopia	1975-80	120.4	100.0	20.4	24.2	9.6	11.5	...	...	26.9	8.2	17.9	45.4	24.6	20.7	2.7
Gabon	1975-76, 80	145.9	100.0	45.9	57.7	2.9	53.2	1.3	1.5	7.5	6.4	0.2	30.4	26.9	3.0	0.1
Gambia	1975-80	124.6	100.0	24.6	16.3	6.5	9.1	...	0.6	3.6	...	1.0	78.9	66.8	11.9	...
Ghana	1975-80	110.2	100.0	10.2	21.9	10.5	11.3	...	0.2	27.4	5.4	21.2	50.1	16.7	33.3	0.3
Guinea	1977-79	136.8	100.0	36.8	27.9	...	...	2.5	...	4.2	4.2	...	64.1	28.7	33.2	1.3
Kenya	1975-80	114.3	100.0	14.3	37.3	11.0	...	...	...	38.7	25.3	10.8	22.9	22.2	0.7	0.2
Lesotho	1975-77	145.9	100.0	45.9	15.9	10.0	5.0	...	...	4.8	...	...	71.8	71.0	0.8	0.3
Liberia	1975-80	105.8	100.0	5.8	39.1	15.7	22.6	...	...	23.3	1.4	8.5	34.7	33.8	0.5	1.1
Madagascar	1978-80	141.5	100.0	41.5	16.3	9.2	7.1	12.5	...	39.1	22.4	10.7	29.6	25.7	3.9	1.8
Malawi	1975-80	119.6	100.0	19.6	44.9	15.1	29.7	...	...	33.3	26.0	5.2	21.3	21.3	...	0.1
Mali	1975-80	109.3	100.0	9.3	22.5	6.8	14.2	5.0	1.1	29.4	21.7	5.9	27.9	20.1	7.5	4.6
Mauritania	1975-79	138.6	100.0	38.6	27.4	22.1	4.5	7.7	0.1	26.2	20.2	4.3	36.8	35.3	0.8	1.2
Mauritius	1975-80	111.0	100.0	11.0	28.8	15.5	13.2	...	...	18.0	...	12.6	48.3	33.8	14.4	4.5
Morocco	1975-80	120.4	100.0	20.4	25.2	7.6	16.4	5.9	...	39.2	24.6	11.7	22.3	20.6	1.5	3.4
Niger	1976-80	100.0	100.0	0.0	32.0	6.0	22.5	4.6	0.2	22.1	14.4	6.8	39.7	33.8	5.0	2.9
Nigeria ¹	1975-78	113.3	100.0	13.3	78.1	0.1	78.0	...	...	2.9	...	2.9	18.9	18.9	0.0	...
Rwanda	1975-80	100.0	100.0	0.0	18.0	6.6	10.0	4.6	0.0	16.8	...	16.6	57.8	30.1	27.7	1.1
Senegal	1975, 77-80	107.4	100.0	7.4	22.1	9.5	9.1	0.9	0.5	26.8	12.7	12.1	45.1	41.4	3.6	3.2
Sierra Leone	1975-80	111.8	100.0	11.8	27.3	6.8	20.5	...	0.7	18.1	...	16.1	52.2	38.2	13.7	...
Somalia	1975-78	124.5	100.0	24.5	8.7	7.9	0.8	...	...	27.2	...	14.6	53.0	50.7	2.3	2.7
South Africa	1975-80	113.6	100.0	13.6	63.5	25.4	36.2	1.4	0.2	25.6	8.5	16.7	6.1	5.6	0.5	1.8
Sudan	1975-80	118.6	100.0	18.6	14.2	4.0	9.8	...	...	32.2	...	26.7	52.8	42.6	3.9	0.1
Swaziland	1975-80	108.4	100.0	8.4	31.7	11.7	17.8	...	...	2.9	...	...	64.8	48.6	16.2	0.2
Tanzania	1975-80	112.6	100.0	12.6	30.8	5.3	17.3	...	0.4	44.9	38.4	5.4	22.5	13.4	9.1	0.7
Togo	1977-80	112.9	100.0	12.9	38.4	5.2	30.5	7.1	...	16.1	11.7	3.2	36.9	26.3	5.2	1.1
Tunisia	1975-80	123.9	100.0	23.9	18.1	8.4	7.7	12.0	0.2	31.9	7.1	8.7	30.8	28.7	2.1	2.8
Uganda	1975-80	106.2	100.0	6.2	9.7	1.9	7.5	...	...	35.9	27.4	4.0	54.2	10.8	43.1	...
Zaire	1975-80	104.5	100.0	4.5	34.3	19.8	14.5	2.5	2.0	14.5	8.5	5.8	41.7	21.6	19.9	0.4
Zambia	1975-80	112.4	100.0	12.4	41.7	19.6	19.8	...	2.7	47.1	12.1	34.0	8.2	8.0	...	0.0
Zimbabwe	1976-80	121.5	100.0	21.5	59.3	28.2	28.7	...	...	34.4	26.2	7.6	5.0	5.0	...	0.4
Unweighted average		118.5	100.0	18.5	29.5	10.2	17.5	5.2	1.2	23.8	15.5	10.4	40.1	31.0	9.9	1.6

Sources: IMF, Government Finance Statistics; International Financial Statistics; and The World Bank, World Tables 1993.

¹Total revenue includes revenues collected for state and local governments.

Table 9. African Countries: Tax Structure, 1981-85
(In percent of GDP)

Sample Size	Domestic Taxes on Goods and Services										International Trade Taxes		
	Taxes on Income, Profits, and Capital Gains					Of which:					Of which:		
	Of which:					General sales, turnover, or VAT					Import duties		
	Total Revenue	Tax Revenue	Other Revenue	Total	Individual	Corporate	Social Security Taxes	Payroll Taxes	Total	Excises	Total	Export duties	Property Taxes
Benin	...	...	...	...	...	...	...	...	0.6	...	11.6	...	...
Botswana	45.3	26.2	19.1	14.0	2.5	9.9	...	...	0.2	...	11.5	...	0.1
Burkina Faso	14.9	12.8	2.1	2.4	1.5	0.4	1.2	0.2	2.5	0.9	5.6	0.3	0.2
Burundi	14.1	12.9	1.2	3.0	1.3	1.5	0.4	0.3	3.3	3.2	4.1	1.3	1.8
Cameroon	21.3	19.1	2.2	10.1	2.0	8.1	1.1	...	2.7	1.1	4.6	0.8	0.4
Central African Republic	13.0	13.0	0.0	2.3	1.1	1.2	0.9	0.6	3.0	1.1	5.7	1.4	0.1
Chad	5.5	5.3	0.2	0.3	0.3	0.0	...	0.1	0.1	0.0	2.3	0.1	0.1
Congo	37.1	26.6	10.5	17.4	1.8	15.6	1.6	0.5	2.5	0.1	4.0	0.0	0.0
Côte d'Ivoire	25.2	20.0	5.2	3.4	1.6	1.5	1.2	1.0	4.4	1.4	8.3	2.5	0.6
Djibouti	34.3	23.7	10.6	4.5	2.3	2.2	...	...	15.4	9.9	1.7	0.0	1.2
Ethiopia	21.9	16.6	5.3	5.8	1.6	3.6	...	...	4.9	3.1	5.2	0.0	0.5
Gabon	40.3	28.9	11.4	19.2	1.2	17.4	...	0.6	2.4	1.9	6.5	0.5	0.1
Gambia	16.8	15.4	1.4	2.8	1.4	1.2	...	0.1	1.0	0.4	11.5	0.6	...
Ghana	7.0	5.9	1.1	1.5	0.7	0.8	...	0.0	1.9	1.6	2.5	1.3	0.0
Guinea	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenya	21.0	18.8	2.3	6.0	...	...	...	...	8.0	1.9	4.6	0.2	...
Lesotho	42.5	37.1	5.4	4.5	3.1	1.4	...	...	4.1	0.7	28.3	0.5	0.0
Liberia	20.7	19.9	0.7	7.5	5.6	1.8	...	...	5.5	2.5	6.3	0.1	0.2
Madagascar	16.4	13.7	2.6	2.5	1.3	1.2	1.9	...	5.8	1.3	3.2	0.5	0.3
Malawi	19.9	17.2	2.7	6.6	2.6	4.0	...	...	6.1	0.8	4.3	0.2	0.0
Mali	13.5	11.8	1.7	1.9	0.6	1.1	0.5	0.3	4.8	2.0	2.7	0.7	0.5
Mauritania	22.1	18.3	3.8	5.7	3.7	1.8	...	0.0	3.6	2.6	8.7	2.7	0.2
Mauritius	21.3	18.8	2.5	3.0	1.8	1.2	0.6	...	4.0	2.1	10.3	2.9	0.7
Morocco	24.8	20.6	4.2	4.4	2.3	1.9	1.2	...	8.6	2.1	4.6	0.3	0.5
Niger	...	...	...	...	...	...	...	...	...	...	...	...	...
Nigeria ¹	15.1	9.5	5.6	7.0	0.0	7.0	...	...	1.0	1.0	1.5	0.0	...
Rwanda	...	...	...	...	...	...	...	...	...	...	...	...	...
Senegal	20.0	18.0	2.0	4.2	2.3	1.1	0.7	0.3	5.2	1.5	7.1	0.1	0.5
Sierra Leone	10.2	9.3	0.9	2.5	1.1	1.4	...	0.0	2.3	2.2	4.3	0.6	...
Somalia	...	...	...	...	...	...	...	...	...	...	...	...	...
South Africa	24.4	21.9	2.5	12.8	6.4	6.1	0.3	0.0	7.2	2.4	0.9	0.0	0.4
Sudan	12.5	10.0	2.5	2.0	0.7	1.2	...	...	1.8	1.8	6.2	0.5	0.0
Swaziland	30.6	28.0	2.5	7.8	4.0	3.3	...	...	0.9	...	19.1	0.5	0.1
Tanzania	15.9	15.3	0.6	4.6	1.8	2.8	...	0.0	8.8	0.0	1.6	0.2	0.3
Togo	28.4	23.8	4.6	9.6	1.9	7.0	1.7	...	3.6	0.4	8.5	0.2	0.1
Tunisia	34.0	25.6	8.4	4.8	2.1	2.3	2.8	0.2	7.1	2.7	9.6	0.2	0.7
Uganda	6.5	6.4	0.1	0.4	0.0	0.4	...	...	1.9	0.3	4.0	0.8	...
Zaire	9.2	8.1	1.1	2.8	1.4	1.4	0.1	0.1	1.9	0.5	2.9	0.9	0.0
Zambia	23.0	21.4	1.6	7.4	2.9	3.8	...	0.4	10.5	7.2	3.0	1.0	0.0
Zimbabwe	29.3	26.2	3.1	12.9	7.1	5.2	...	...	9.1	6.2	3.9	...	0.1
Unweighted average	21.6	17.9	3.8	5.9	2.1	3.6	1.0	0.3	4.5	2.8	6.3	0.7	0.3

Sources: IMF, *Government Finance Statistics*; *International Financial Statistics*; and The World Bank, *World Tables 1993*.

¹Total revenue includes revenues collected for state and local governments.

Table 10. African Countries: Tax Structure, 1981-85
(In percent of total tax revenue)

Domestic Taxes on Goods and Services														
Taxes on Income, Profits, and Capital Gains					Of which:					International Trade Taxes				
Sample Size	Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	General sales, turnover, or VAT		Excises	Of which:	
					Individual	Corporate				Import duties	Export duties		Property Taxes	
Benin	171.8	100.0	71.8	52.9	9.6	37.4	...	...	2.2	1.3	...	...	44.6	...
Bolswana	116.6	100.0	16.6	18.9	11.8	3.5	9.6	1.5	19.9	8.9	7.0	...	43.8	0.3
Burkina Faso	109.4	100.0	9.4	23.4	9.9	11.9	3.5	2.0	25.8	...	25.1	...	31.5	1.3
Burundi	111.6	100.0	11.6	51.3	10.9	40.1	5.8	...	14.4	6.6	6.2	...	25.1	13.6
Cameroun	100.0	100.0	0.0	17.7	8.5	9.2	7.0	4.3	22.9	6.6	8.2	...	43.8	2.1
Central African Republic	103.2	100.0	3.2	5.8	5.3	0.0	...	1.2	2.7	1.2	0.0	...	42.5	0.5
Chad	139.8	100.0	39.8	65.2	6.6	58.4	5.9	1.9	9.5	9.0	0.3	...	15.1	1.4
Congo	126.5	100.0	26.5	17.0	7.9	7.7	6.0	4.9	22.1	9.7	6.8	...	41.1	0.2
Côte d'Ivoire	145.1	100.0	45.1	19.1	9.5	9.5	...	...	65.0	41.8	14.6	...	7.3	2.9
Djibouti	131.9	100.0	31.9	35.1	9.9	21.9	...	...	29.3	10.1	18.7	...	31.6	5.2
Ethiopia	139.6	100.0	39.6	66.3	4.2	60.2	...	...	8.3	6.6	...	...	22.4	3.1
Gabon	109.1	100.0	9.1	17.9	9.0	7.9	...	2.1	0.6	...	...	...	20.7	0.4
Gambia	117.3	100.0	17.3	25.3	12.1	12.7	...	0.0	33.3	3.7	27.7	...	74.5	...
Ghana	154.2	100.0	54.2	38.0	4.4	24.6	4.4	0.8	6.0	2.3	1.8	...	41.4	0.0
Guinea	112.2	100.0	12.2	31.9	...	...	...	...	42.9	29.6	10.0	...	50.5	0.1
Kenya	115.2	100.0	15.2	12.4	8.6	3.8	...	...	11.0	7.1	2.5	...	24.5	0.1
Lesotho	103.8	100.0	3.8	37.7	28.4	8.8	...	...	27.7	2.7	12.5	...	74.6	0.0
Liberia	118.9	100.0	18.9	17.9	9.4	8.5	13.7	...	42.1	24.1	9.7	...	31.1	0.9
Madagascar	115.8	100.0	15.8	38.4	15.4	23.1	...	...	35.8	29.4	4.8	...	25.1	2.3
Malawi	114.2	100.0	14.2	15.8	5.0	9.5	4.3	2.6	40.9	23.0	16.5	...	32.2	0.1
Mali	120.8	100.0	20.8	31.3	20.3	9.9	...	0.1	19.5	3.7	14.1	...	17.0	4.0
Mauritania	113.3	100.0	13.3	16.4	9.7	6.7	3.2	...	21.3	3.5	11.1	...	47.4	1.3
Mauritius	120.2	100.0	20.2	21.2	11.1	9.1	6.0	...	41.8	28.0	10.2	...	55.0	3.8
Morocco	159.9	100.0	59.9	73.6	0.1	73.5	...	...	10.0	...	...	...	22.3	2.6
Niger	111.2	100.0	11.2	23.1	13.0	6.1	...	...	28.7	18.5	8.4	...	16.1	...
Nigeria ¹	110.4	100.0	10.4	28.0	12.4	15.4	...	...	24.9	...	23.5	...	16.0	...
Rwanda	111.3	100.0	11.3	58.5	29.2	27.8	1.3	0.2	32.6	21.1	11.2	...	...	...
Senegal	124.7	100.0	24.7	19.6	7.0	12.4	...	...	17.6	...	17.6	...	38.5	0.1
Sierra Leone	109.0	100.0	9.0	28.2	14.5	11.9	...	...	3.1	1.7	...	...	39.3	2.6
Somalia	104.1	100.0	4.1	32.2	6.7	19.6	...	...	57.3	56.5	0.0	...	44.9	...
South Africa	119.5	100.0	19.5	40.3	8.0	29.4	7.4	0.2	15.0	11.5	0.0	...	...	...
Sudan	132.7	100.0	32.7	18.6	8.2	9.1	10.9	0.9	27.9	9.3	1.5	...	35.8	0.6
Swaziland	102.6	100.0	2.6	9.0	1.4	7.2	...	...	34.6	26.3	4.9	...	37.3	1.3
Tanzania	113.5	100.0	13.5	35.3	17.6	17.7	1.4	1.5	24.1	18.0	10.4	...	36.3	0.9
Togo	107.5	100.0	7.5	34.5	13.7	17.7	...	...	49.1	15.1	5.9	...	14.6	2.6
Tunisia	111.7	100.0	11.7	49.4	27.2	20.1	...	2.0	34.8	23.5	33.4	...	33.8	...
Uganda	120.2	100.0	20.2	31.3	11.0	18.6	5.6	...	25.3	14.9	10.6	...	35.5	...
Zaire	111.3	100.0	11.3	58.5	29.2	27.8	...	1.4	...	...	...	...	29.1	0.1
Zambia	111.7	100.0	11.7	49.4	27.2	20.1	...	...	34.8	23.5	10.9	...	14.1	0.3
Zimbabwe	120.2	100.0	20.2	31.3	11.0	18.6	...	...	25.3	14.9	10.6	...	14.6	...
Unweighted average	120.2	100.0	20.2	31.3	11.0	18.6	5.6	1.4	25.3	14.9	10.6	...	35.5	1.8

Sources: IMF, *Government Finance Statistics*; *International Financial Statistics*; and The World Bank, *World Tables 1993*.

¹Total revenue includes revenues collected for state and local governments.

Table 11. African Countries: Tax Structure, 1986-92
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes					
		Total Revenue	Tax Revenue	Other Revenue	Total	Individual	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:		Property Taxes
							Corporate	General sales, turnover, or VAT				Excises	Import duties		Export duties		
Benin	1986-91	58.2	31.4	26.8	22.3	1.9	18.3	...	...	0.9	0.7	...	8.2	...	...	...	...
Botswana	1986	15.7	13.0	2.7	2.3	1.3	0.5	1.3	0.2	2.1	0.7	...	6.1	5.4	0.2	0.0	0.0
Burkina Faso	1986	17.0	15.6	1.4	2.9	1.4	1.3	0.6	0.2	2.9	...	...	2.8	3.0	3.7	2.3	2.3
Burundi	1986-91	18.2	13.9	4.3	5.9	1.5	4.3	1.1	...	3.0	1.6	...	2.8	2.4	0.4	0.2	0.2
Cameroon	1986-91	...	...	...	...	...	...	...	0.2	2.9	...	...	...	...	...	...	...
Central African Republic	1986-91	8.2	7.2	0.9	1.6	...	...	...	...	...	...	...	2.0	...	...	0.2	0.2
Chad	1986-91	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Congo	1986	26.6	21.3	5.3	3.5	1.7	1.6	1.3	1.0	4.5	1.7	1.4	...	7.0	2.8	0.4	...
Côte d'Ivoire	1986	29.9	24.4	5.6	4.8	3.2	1.7	...	...	15.0	8.7	4.2	1.5	0.0	0.0	1.6	1.6
Djibouti	1986-89	27.6	18.6	8.9	7.6	2.0	5.1	...	...	5.8	1.8	3.9	3.0	1.6	0.4	...	...
Ethiopia	1989-91	27.2	18.3	8.9	6.4	1.7	4.3	0.2	0.3	6.1	2.1	3.2	5.1	4.7	0.4	0.1	0.1
Gabon	1986-90	19.1	18.2	0.8	2.7	1.0	1.5	...	0.1	2.4	1.4	0.2	13.0	12.7	0.4	...	...
Gambia	1986-88	13.7	12.4	1.4	3.2	1.1	2.1	...	0.0	3.7	1.0	2.7	5.4	2.5	0.9	0.0	0.0
Ghana	1986-90	11.7	11.4	0.4	...	...	...	...	...	1.8	...	...	5.2	0.8	4.5	...	...
Guinea	1986-91	21.7	19.4	2.3	6.1	...	...	...	...	9.3	6.8	1.7	3.8	3.5	0.3	0.0	0.0
Kenya	1986-91	41.6	36.2	5.3	5.2	3.3	1.9	...	...	8.8	7.5	0.9	22.1	22.1	0.0	0.0	0.0
Lesotho	1986-91	17.1	16.4	0.8	6.1	4.9	1.2	...	...	4.7	0.3	2.0	5.2	5.1	0.0	0.2	0.2
Liberia	1986-88	11.3	8.9	2.4	1.3	0.5	0.7	...	...	2.3	1.0	0.7	5.0	4.1	1.0	0.1	0.1
Madagascar	1986-91	21.1	18.2	2.9	7.7	2.7	5.0	...	...	7.0	6.1	0.6	3.4	3.4	0.0	0.0	0.0
Malawi	1986-88	16.9	12.7	4.2	1.6	0.6	1.0	0.8	0.2	4.2	2.8	1.2	3.8	3.1	0.6	0.3	0.3
Mali	1986-88	22.5	18.1	4.4	6.4	3.2	2.9	...	0.0	3.6	0.8	2.7	7.8	4.6	3.2	0.2	0.2
Mauritania	1986-92	23.0	20.7	2.3	2.8	1.2	1.6	1.0	0.1	4.7	1.8	1.7	11.0	9.3	1.7	1.1	1.1
Mauritius	1986-90	24.4	21.4	2.9	4.9	2.5	2.0	1.0	...	10.5	5.3	4.5	3.8	3.7	0.1	0.6	0.6
Morocco	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Niger	1986-87	19.0	9.9	9.1	7.0	0.0	6.6	...	...	1.0	...	...	1.9	1.9	0.0	...	...
Nigeria ¹	1986-92	11.2	11.2	0.0	2.0	1.0	0.5	0.6	...	4.4	1.0	3.1	3.7	2.8	0.7	0.0	0.0
Rwanda	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Senegal	1986-91	8.0	7.2	0.8	2.2	0.5	1.0	...	0.0	1.9	...	1.5	3.1	2.8	0.1	0.0	0.0
Sierra Leone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Somalia	1986-90	28.0	25.8	2.2	13.9	8.2	5.5	0.5	0.0	9.1	6.7	1.4	1.5	1.4	0.0	0.4	0.4
South Africa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sudan	1986-90	28.6	25.8	2.8	9.6	3.4	5.7	...	...	3.5	3.3	...	12.4	11.7	0.6	0.1	0.1
Swaziland	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tanzania	1986-87	27.7	22.2	5.6	8.7	2.2	5.9	1.9	...	2.3	1.6	0.3	9.0	7.3	0.3	0.2	0.2
Togo	1986-92	30.6	23.7	7.0	4.1	1.7	1.7	3.2	0.3	6.6	3.0	2.8	8.3	8.1	0.1	0.6	0.6
Tunisia	1986	4.8	4.8	0.0	0.3	0.0	0.2	...	...	0.9	0.7	0.2	3.6	0.3	3.2	...	...
Uganda	1986-91	9.6	8.8	0.9	2.8	1.8	1.1	0.1	0.1	1.5	0.8	0.6	4.0	2.9	1.2	0.0	0.0
Zaire	1986-89	20.7	19.3	1.3	6.1	1.7	3.5	...	0.1	7.4	4.6	2.6	5.7	3.6	1.9	0.1	0.1
Zambia	1986-87	32.4	29.0	3.4	14.4	8.8	5.1	...	...	9.2	5.7	3.4	5.1	5.0	...	0.1	0.1
Zimbabwe	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Unweighted average		21.7	17.7	4.0	5.7	2.2	3.2	1.0	0.2	4.8	3.0	1.9	6.1	5.1	1.0	0.3	0.3

Sources: IMF, *Government Finance Statistics*; *International Financial Statistics*; and The World Bank, *World Tables 1993*.

¹Total revenue includes revenues collected for state and local governments.

Table 12. African Countries: Tax Structure, 1986-92
(In percent of total tax revenue)

		Taxes on Income, Profits, and Capital Gains										Domestic Taxes on Goods and Services					International Trade Taxes			
		Sample Size	Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:		Property Taxes			
							Individual	Corporate				General sales, turnover, or VAT	Excises		Import duties	Export duties				
Benin	1986-91	185.8	100.0	85.8	70.7	5.9	57.9	...	...	2.8	2.3	...	...	26.3	26.3	...	...	
Botswana	1987	125.4	100.0	25.4	19.5	10.9	4.7	9.7	1.4	23.2	11.3	8.2	...	38.1	33.8	1.6	0.1			
Burkina Faso	1986	108.8	100.0	8.8	18.7	8.7	8.5	3.8	1.4	18.5	...	18.1	...	42.9	19.3	23.3	14.7			
Burundi	1986-92	137.2	100.0	37.2	38.7	11.0	27.7	6.7	...	23.0	12.4	9.9	...	21.6	19.2	2.3	1.3			
Cameroon	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Central African Republic	1986-91	113.5	100.0	13.5	22.3	...	...	...	2.6	39.6	...	...	...	28.8	...	...	2.2
Chad	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Congo	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Côte d'Ivoire	1990	114.9	100.0	14.9	16.6	7.9	7.1	6.4	4.4	25.3	8.7	11.8	...	39.8	31.1	8.7	3.3			
Djibouti	1986, 1988	115.9	100.0	15.9	18.9	12.5	6.3	...	...	63.7	36.7	18.0	...	6.5	...	...	6.2
Ethiopia	1986-89	147.7	100.0	47.7	40.9	10.9	27.4	...	...	31.1	9.9	20.8	...	24.8	16.2	8.7	2.1	
Gabon	1989-91	149.8	100.0	49.8	34.2	9.5	22.6	1.2	2.0	33.3	11.7	17.4	...	28.2	26.2	2.0	0.8			
Gambia	1986-90	104.6	100.0	4.6	14.8	5.5	8.2	...	0.4	12.5	7.2	1.3	...	72.0	70.0	2.0	...			
Ghana	1986-88	111.0	100.0	11.0	25.7	9.1	16.6	...	0.0	30.3	7.8	22.1	...	43.9	20.5	23.4	0.1			
Guinea	1986-90	109.2	100.0	9.2	...	...	...	...	...	20.6	...	...	...	76.4	10.9	65.4	...
Kenya	1986-91	111.7	100.0	11.7	31.5	...	...	...	...	47.5	35.0	8.6	...	19.7	18.1	1.5	0.0
Lesotho	1986-91	114.6	100.0	14.6	14.2	9.1	5.1	...	...	24.6	21.0	2.4	...	61.0	60.9	0.1	0.1	
Liberia	1986-88	104.6	100.0	4.6	37.5	29.7	7.1	...	...	28.5	2.1	12.1	...	31.4	31.2	0.2	1.1	
Madagascar	1988-91	127.1	100.0	27.1	15.4	5.6	8.1	...	...	25.7	10.7	8.0	...	56.6	45.5	11.1	1.5	
Malawi	1986-90	116.1	100.0	16.1	42.2	14.8	27.3	...	...	38.3	33.6	3.3	...	18.8	18.6	0.2	0.1	
Mali	1986-88	133.0	100.0	33.0	12.8	4.6	7.6	6.3	1.9	33.4	21.8	9.3	...	29.8	24.7	4.5	2.5			
Mauritania	1986-88	124.7	100.0	24.7	35.2	17.6	16.0	...	0.2	19.8	4.3	14.8	...	43.2	25.4	17.8	1.3			
Mauritius	1986-92	111.0	100.0	11.0	13.2	5.7	7.5	4.8	0.3	22.7	8.5	7.9	...	53.3	44.7	8.2	5.3			
Morocco	1986-90	113.5	100.0	13.5	22.7	11.7	9.4	4.8	...	49.1	24.8	20.8	...	17.7	17.2	0.5	2.8			
Niger	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nigeria ¹	1986-87	196.3	100.0	96.3	71.7	0.2	68.0	...	...	9.7	...	9.7	...	18.6	18.4	0.2	...	
Rwanda	1989-92	100.0	100.0	0.0	18.1	8.9	4.4	5.6	...	39.1	9.0	27.9	...	32.7	24.7	5.9	0.4			
Senegal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sierra Leone	1986-92	111.3	100.0	11.3	30.5	8.5	17.3	...	0.2	26.2	0.4	20.7	...	42.9	...	...	0.0	
Somalia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
South Africa	1986-90	108.5	100.0	8.5	54.1	31.9	21.4	1.9	0.1	35.3	25.9	5.5	...	5.6	5.5	0.0	1.7			
Sudan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Swaziland	1986-91	110.6	100.0	10.6	36.7	12.6	21.9	...	...	13.6	12.8	...	...	48.8	46.3	2.5	0.3
Tanzania	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Togo	1986-87	125.1	100.0	25.1	39.5	9.8	26.6	8.4	...	10.3	7.2	1.4	...	40.6	33.1	1.2	0.9			
Tunisia	1986-92	129.4	100.0	29.4	17.3	7.4	7.0	13.4	1.3	27.9	12.8	11.9	...	35.0	34.1	0.4	2.4			
Uganda	1986	100.0	100.0	0.0	5.5	0.5	5.0	...	...	19.1	14.9	3.4	...	75.3	6.2	67.3	...	
Zaire	1986-91	110.5	100.0	10.5	32.7	20.9	11.7	1.0	0.9	17.0	9.0	7.5	...	44.9	32.3	12.5	0.1			
Zambia	1986-89	106.5	100.0	6.5	32.6	8.8	19.4	...	0.4	38.4	24.3	13.6	...	28.3	18.3	8.8	0.3			
Zimbabwe	1986-91	111.8	100.0	11.8	50.4	30.4	18.3	...	...	29.8	19.4	10.1	...	18.6	18.1	...	0.3	
Unweighted average		121.6	100.0	21.6	30.2	11.4	17.1	5.3	1.1	27.5	14.5	11.7	...	36.6	27.5	9.7	2.0			

Sources: IMF, *Government Finance Statistics*; *International Financial Statistics*; and The World Bank, *World Tables 1993*.
¹Total revenue includes revenues collected for state and local governments.

Table 13. Non-OECD Asian Countries: Tax Structure, 1975-80
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services					International Trade Taxes					
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Import duties	Export duties	Property Taxes
						Individual	Corporate				General sales, turnover, or VAT	Excises				
Bangladesh	1980	11.4	7.8	3.6	1.2	1.1	0.1	0.0	0.0	2.9	1.4	1.4	3.3	3.0	0.2	0.2
Bhutan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fiji	1975-80	20.8	17.5	3.3	9.5	6.9	2.4	...	...	2.2	...	...	5.9	5.6	0.3	0.1
India	1975-80	12.1	9.9	2.2	2.4	1.2	1.2	0.0	0.0	5.1	0.1	5.0	2.2	2.0	0.1	0.1
Indonesia	1975-80	20.1	18.7	1.4	14.0	0.5	12.6	0.0	0.0	2.4	1.4	0.9	2.0	1.3	0.7	0.3
Korea	1975-80	16.7	15.0	1.8	4.1	2.1	1.8	0.2	0.0	7.4	2.8	3.0	2.6	2.6	0.0	0.2
Malaysia	1975-80	23.5	21.1	2.4	8.5	...	6.1	0.1	0.0	4.7	1.2	2.1	7.5	3.5	3.9	0.1
Myanmar	1975-80	13.8	9.5	4.3	0.9	...	...	0.0	0.0	6.5	5.7	0.1	2.1	2.1	0.0	0.0
Nepal	1975-80	7.3	6.1	1.2	0.6	...	...	0.0	0.0	2.5	1.4	0.9	2.4	2.1	0.2	0.7
Papua New Guinea	1975-80	18.1	15.4	2.7	9.7	4.5	5.2	0.0	0.0	2.5	0.0	2.3	3.1	2.8	0.4	0.0
Philippines	1975-80	13.6	11.8	1.8	2.9	1.5	1.4	0.0	0.0	4.8	1.9	2.4	3.8	3.3	0.5	0.1
Singapore	1975-80	24.9	16.8	8.1	7.9	...	...	0.0	0.4	3.7	0.0	1.6	1.9	1.9	0.0	2.5
Solomon Islands	1975-80	16.1	12.7	3.4	4.4	2.2	2.2	0.0	0.0	0.9	0.0	0.6	7.3	4.3	3.0	0.0
Sri Lanka	1975-80	20.4	18.8	1.5	2.8	0.8	2.0	0.0	0.0	6.1	2.4	3.5	9.6	2.7	5.0	0.2
Thailand	1975-80	13.0	11.8	1.2	2.2	1.0	1.3	0.0	0.0	6.0	2.6	2.4	3.4	2.8	0.5	0.2
Unweighted average		16.6	13.8	2.8	5.1	2.2	3.3	0.0	0.0	4.1	1.5	2.0	4.1	2.9	1.1	0.3

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 14. Non-OECD Asian Countries: Tax Structure, 1975-80
(In percent of total tax revenue)

	Taxes on Income, Profits, and Capital Gains										Domestic Taxes on Goods and Services					International Trade Taxes			
	Sample Size	Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Import duties	Export duties	Property Taxes			
						Individual	Corporate				General sales, turnover, or VAT	Excises							
Bangladesh	1975-80	149.1	100.0	49.1	14.9	13.5	1.3	0.0	0.0	40.5	16.0	23.0	36.9	34.3	1.7	3.5			
Bhutan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fiji	1975-80	118.9	100.0	18.9	54.3	39.3	13.6	0.0	0.0	12.3	0.0	9.5	...	32.1	1.9	0.6			
India	1975-80	122.2	100.0	22.2	24.8	12.5	11.7	0.0	0.0	51.9	1.1	50.3	22.3	20.2	1.4	1.0			
Indonesia	1975-80	107.7	100.0	7.7	74.6	2.7	66.8	0.0	0.0	12.9	7.7	5.1	10.6	7.1	3.5	1.5			
Korea	1975-80	111.8	100.0	11.8	27.1	14.1	12.2	1.1	0.0	49.3	18.9	20.1	17.6	17.6	0.0	1.5			
Malaysia	1975-80	111.3	100.0	11.3	40.0	...	28.9	0.5	0.0	22.4	5.7	9.8	35.4	16.8	18.5	0.6			
Myanmar	1975-80	144.0	100.0	44.0	10.4	...	...	0.0	0.0	67.3	59.2	0.7	22.3	22.3	0.0	0.0	
Nepal	1975-80	119.1	100.0	19.1	8.6	...	...	0.0	0.0	40.2	22.1	14.0	38.7	34.8	3.8	12.1	
Papua New Guinea	1975-80	117.8	100.0	17.8	62.0	29.7	32.3	0.0	0.0	16.6	0.0	15.2	20.8	18.3	2.4	0.0			
Philippines	1975-80	114.9	100.0	14.9	24.3	12.5	11.7	0.0	0.0	40.5	15.9	20.3	31.9	28.0	4.0	1.2			
Singapore	1975-80	148.2	100.0	48.2	46.7	...	...	0.0	2.6	22.0	0.0	9.3	11.1	11.1	0.0	14.7	
Solomon Islands	1975-80	127.0	100.0	27.0	34.7	17.6	17.1	0.0	0.0	7.7	0.0	5.2	57.0	34.3	22.5	0.0			
Sri Lanka	1975-80	108.5	100.0	8.5	15.5	4.4	11.1	0.0	0.0	32.9	13.1	18.8	49.8	14.0	24.0	1.0			
Thailand	1975-80	110.2	100.0	10.2	18.8	8.2	10.6	0.2	0.0	50.4	22.4	20.6	28.6	24.1	4.5	1.4			
Unweighted average		122.2	100.0	22.2	32.6	15.4	19.7	0.1	0.2	33.4	13.0	15.9	29.8	22.5	6.3	2.8			

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 15. Non-OECD Asian Countries: Tax Structure, 1981-85
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes			
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:		
					Individual	Corporate				General sales, turnover, or VAT	Excises		Import duties	Export duties	
															Property Taxes
Bangladesh	1981-85	10.8	7.6	3.2	1.0	1.0	0.0	0.0	2.7	1.1	1.6	3.4	2.8	0.2	0.2
Bhutan	1982-85	11.1	5.8	5.3	1.5	0.5	1.0	0.0	3.9	0.6	2.9	0.1	0.0	0.1	0.1
Fiji	1981-85	24.4	20.5	3.9	10.9	8.0	2.7	0.0	2.7	0.0	2.1	6.5	6.3	0.2	0.1
India	1981-85	12.8	10.2	2.5	2.1	0.9	1.2	0.0	5.0	0.1	4.8	3.0	2.9	0.0	0.1
Indonesia	1981-85	21.2	18.5	2.7	15.1	0.5	13.9	0.0	2.3	1.3	1.0	0.9	0.7	0.1	0.2
Korea	1981-85	17.8	15.5	2.3	4.2	2.2	2.0	0.2	7.9	3.8	2.4	2.6	2.6	0.0	0.2
Malaysia	1981-85	27.3	22.2	5.1	10.3	2.3	8.0	0.1	4.7	1.5	1.8	6.5	3.6	2.9	0.1
Myanmar	1981-85	15.3	9.2	6.1	0.5	...	...	0.0	6.1	5.4	0.0	2.5	2.5	0.0	0.0
Nepal	1981-85	8.5	7.2	1.3	0.7	0.5	0.2	0.0	3.4	2.0	1.0	2.5	2.3	0.1	0.6
Papua New Guinea	1981-85	20.2	17.6	2.6	10.1	5.8	4.2	0.0	2.7	0.0	2.5	4.5	4.1	0.4	0.0
Philippines	1981-85	11.9	10.6	1.3	2.6	1.1	1.4	0.0	4.6	1.3	2.2	3.0	2.8	0.2	0.1
Singapore	1981-85	31.9	18.5	13.4	9.1	...	...	0.0	3.9	0.0	1.5	1.3	1.3	0.0	2.9
Solomon Islands	1981-85	22.1	19.2	2.9	7.0	4.0	3.0	0.0	0.6	0.0	0.2	11.5	8.0	3.4	0.0
Sri Lanka	1981-85	19.5	17.1	2.4	3.0	0.8	2.2	0.0	6.9	4.8	2.0	6.9	3.7	3.2	0.3
Thailand	1981-85	15.4	13.9	1.5	3.1	1.5	1.5	0.0	7.2	2.8	3.7	3.3	2.9	0.4	0.2
Unweighted average		18.0	14.2	3.8	5.4	2.2	3.2	0.0	4.3	1.7	2.0	3.9	3.1	0.7	0.3

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 16. Non-OECD Asian Countries: Tax Structure, 1981-85
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes			
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Of which:			Total	Import duties	Export duties	Property Taxes
					Total	Individual			Corporate	General sales, turnover, or VAT	Excises				
Bangladesh	1981-85	143.2	100.0	43.2	13.6	13.6	0.1	0.0	36.0	14.2	21.4	45.4	36.8	1.9	2.4
Bhutan	1982-85	190.1	100.0	90.1	26.3	8.5	17.8	0.7	67.2	10.1	49.4	2.0	0.8	1.2	2.4
Fiji	1981-85	119.0	100.0	19.0	53.4	38.9	13.3	0.0	13.3	0.0	10.4	31.5	30.7	0.8	0.4
India	1981-85	124.6	100.0	24.6	21.1	8.6	11.5	0.0	48.6	1.2	47.0	29.6	28.8	0.4	0.7
Indonesia	1981-85	114.5	100.0	14.5	81.4	2.8	75.2	0.0	12.3	7.1	5.3	4.6	4.0	0.7	1.1
Korea	1981-85	115.1	100.0	15.1	26.9	14.2	12.7	1.4	50.9	24.5	15.4	16.5	16.5	0.0	1.0
Malaysia	1981-85	122.8	100.0	22.8	46.4	10.3	36.1	0.7	21.1	6.9	8.0	29.3	16.2	13.1	0.6
Myanmar	1981-85	166.5	100.0	66.5	6.1	...	...	0.0	66.4	59.0	0.2	27.5	27.5	0.0	0.0
Nepal	1981-85	118.3	100.0	18.3	9.2	6.9	2.3	0.0	47.9	27.4	14.3	34.4	32.6	1.8	8.1
Papua New Guinea	1981-85	114.6	100.0	14.6	57.3	33.0	23.9	0.0	15.4	0.1	14.4	25.6	23.3	2.1	0.1
Philippines	1981-85	112.8	100.0	12.8	25.0	10.3	13.5	0.0	43.3	12.5	21.3	28.5	26.1	1.5	0.9
Singapore	1981-85	174.1	100.0	74.1	48.8	...	...	0.0	21.1	0.0	7.9	7.2	7.2	0.0	15.5
Solomon Islands	1981-85	115.0	100.0	15.0	36.3	20.7	15.6	0.0	3.4	0.0	0.8	59.8	41.6	17.9	0.0
Sri Lanka	1981-85	113.6	100.0	13.6	17.6	4.9	12.7	0.0	40.5	28.0	11.7	40.0	21.3	18.7	1.9
Thailand	1981-85	110.8	100.0	10.8	22.0	11.0	11.0	0.2	51.9	20.3	26.4	23.8	20.5	3.1	1.4
Unweighted average		130.3	100.0	30.3	32.8	14.1	18.9	0.2	36.0	14.1	16.9	27.0	22.2	4.2	2.4

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 17. Non-OECD Asian Countries: Tax Structure, 1986-92
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes			
		Total Revenue	Tax Revenue	Other Revenue	Of which:			Payroll Taxes	Total	Of which:		Total	Of which:		
					Individual	Corporate				General sales, turnover, or VAT	Excises		Import duties	Export duties	
						Property Taxes									
Bangladesh	1986-89	9.5	7.5	2.0	1.0	0.6	0.4	0.0	2.8	0.9	1.9	2.8	2.2	0.6	0.2
Bhutan	1986, 88-90	18.0	5.5	12.4	1.8	0.5	1.3	0.0	3.5	0.8	2.4	0.1	0.1	0.0	0.1
Fiji	1986-90	24.2	20.3	4.0	9.3	6.2	2.7	0.0	3.4	0.0	2.5	7.2	7.0	0.2	0.0
India	1986-91	14.3	11.2	3.2	2.1	1.0	1.1	0.0	5.0	0.1	4.8	4.0	3.9	0.0	0.1
Indonesia	1986-91	19.0	16.2	2.8	10.1	0.8	9.1	0.0	4.4	3.3	1.0	1.1	0.9	0.2	0.3
Korea	1986-92	17.8	15.7	2.1	5.5	3.0	2.4	0.7	6.4	3.8	2.0	2.2	2.2	0.0	0.3
Malaysia	1986-91	27.1	19.2	8.0	8.7	2.2	6.5	0.2	5.0	1.7	1.9	4.6	2.8	1.8	0.1
Myanmar	1986-90	10.3	5.8	4.6	1.0	1.0	0.0	0.0	3.3	2.7	0.0	1.4	1.4	0.0	0.0
Nepal	1986-91	9.6	7.8	1.8	0.9	...	...	0.0	3.5	1.9	1.2	2.8	2.7	0.1	0.5
Papua New Guinea	1986-92	23.7	18.8	4.9	9.6	5.9	3.5	0.0	2.8	0.0	2.5	5.9	5.4	0.5	0.0
Philippines	1986-92	15.7	13.2	2.5	4.1	1.3	1.8	0.0	4.8	1.4	2.5	3.8	3.8	0.0	0.1
Singapore	1986-91	33.0	15.8	17.2	6.5	...	...	0.0	5.0	0.0	1.1	0.7	0.7	0.0	1.8
Solomon Islands	1986-88	22.9	20.7	2.2	7.0	5.2	1.9	0.0	0.6	0.0	0.1	13.2	10.3	2.9	0.0
Sri Lanka	1986-92	20.6	18.0	2.6	2.3	0.8	1.5	0.0	8.8	5.8	2.5	6.0	5.3	0.7	0.8
Thailand	1986-90	17.1	15.6	1.5	3.6	1.7	1.9	0.0	7.9	3.2	4.1	3.6	3.5	0.1	0.4
Unweighted average		18.9	14.1	4.8	4.9	2.3	2.6	0.1	4.5	1.7	2.0	4.0	3.5	0.5	0.3

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 18. Non-OECD Asian Countries: Tax Structure, 1986-92
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services						International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:			Payroll Taxes	Total	Of which:		Total	Of which:		
						Individual	Corporate	Social Security Taxes			General sales, turnover, or VAT	Excises		Import duties	Export duties	
Bangladesh	1986-89	126.3	100.0	26.3	13.7	8.6	5.1	0.0	0.0	37.5	12.2	25.0	37.7	28.2	9.0	3.0
	1986, 88-91	344.8	100.0	244.8	31.2	8.8	22.4	0.3	0.0	64.2	14.1	43.0	2.1	1.8	0.4	1.8
Bhutan	1986-92	118.0	100.0	18.0	45.4	29.3	14.1	0.0	0.0	18.7	2.2	12.0	34.5	33.2	1.3	0.1
Fiji	1986-92	129.1	100.0	29.1	19.5	9.4	9.8	0.0	0.0	44.9	1.3	43.1	35.0	34.5	0.2	0.5
India	1986-91	118.2	100.0	18.2	62.3	5.1	55.9	0.0	0.0	27.6	20.5	6.0	7.2	5.8	1.3	1.9
Indonesia	1986-92	113.6	100.0	13.6	34.8	19.2	15.4	4.2	0.0	40.7	23.9	12.5	13.8	13.8	0.0	1.8
Korea	1986-92	141.3	100.0	41.3	45.4	11.5	33.9	1.1	0.0	26.5	9.3	9.9	23.6	14.7	8.9	0.5
Malaysia	1986-91	181.0	100.0	81.0	17.5	17.2	0.0	0.0	0.0	56.8	43.9	0.2	25.8	25.8	0.0	0.0
Myanmar	1986-91	123.5	100.0	23.5	11.7	...	...	0.0	0.0	45.3	24.2	14.8	36.2	34.9	1.3	6.7
Nepal	1986-92	126.2	100.0	26.2	50.8	31.3	18.3	0.0	0.0	15.0	0.1	13.1	31.5	28.7	2.6	0.0
Papua New Guinea	1986-92	119.5	100.0	19.5	30.5	9.8	13.6	0.0	0.0	37.4	10.5	19.7	28.6	28.0	0.1	0.6
Philippines	1986-91	212.9	100.0	112.9	41.1	...	...	0.0	1.4	31.5	0.0	7.4	4.6	4.6	0.0	11.7
Singapore	1986-91	111.7	100.0	11.7	33.9	25.4	8.5	0.0	0.0	3.4	0.0	0.7	62.4	48.5	13.9	0.1
Solomon Islands	1986-92	114.7	100.0	14.7	13.1	4.7	8.4	0.0	0.0	49.1	32.4	13.8	33.3	29.4	3.9	4.5
Sri Lanka	1986-92	110.1	100.0	10.1	24.6	10.7	13.5	0.4	0.0	49.6	20.8	25.3	22.2	21.3	0.7	2.3
Thailand																
Unweighted average		146.1	100.0	46.1	31.7	14.7	16.9	0.4	0.1	36.6	14.4	16.4	26.6	23.5	2.9	2.4

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 19. Middle Eastern Countries: Tax Structure, 1975-80
(In percent of GDP)

Sample Size	Domestic Taxes on Goods and Services									
	Taxes on Income, Profits, and Capital Gains					International Trade Taxes				
	Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Total	Excises	Of which:
				Individual	Corporate					General sales, turnover, or VAT
Bahrain 1975-80	29.9	8.2	21.7	4.5	0.0	4.5	0.0	0.4	0.1	0.0
Egypt 1975-80	40.6	27.6	13.0	4.6	1.8	2.8	0.4	5.1	1.8	0.0
Iran 1975-80	34.7	8.8	26.0	2.8	0.2	2.6	0.7	0.9	0.6	0.0
Israel 1980	46.9	39.6	7.3	21.2	15.9	4.8	3.0	12.8	1.4	11.2
Jordan 1975-80	20.1	15.6	4.5	2.3	...	...	0.0	2.0	1.6	0.0
Kuwait 1977-80	72.0	4.3	67.7	2.9	0.0	2.9	0.0	0.4	0.0	0.0
Oman 1975-80	47.2	13.5	33.7	12.5	0.0	12.5	0.2	0.2	0.0	0.0
Pakistan 1975-80	14.3	11.7	2.6	1.7	1.0	0.7	0.0	5.0	4.0	1.0
Syria 1975-80	31.7	11.6	20.1	2.4	...	...	0.4	1.7	0.2	0.0
Unweighted average	37.5	15.7	21.8	6.1	2.7	4.4	0.5	3.2	1.1	1.4
								4.2	3.7	0.2

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*

Table 20. Middle Eastern Countries: Tax Structure, 1975-80
(In percent of total tax revenue)

Sample Size	Domestic Taxes on Goods and Services									
	Taxes on Income, Profits, and Capital Gains					International Trade Taxes				
	Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Total	Excises	Of which:
				Individual	Corporate					General sales, turnover, or VAT
Bahrain 1975-80	416.3	100.0	316.3	47.9	0.0	47.9	0.5	5.8	0.8	0.0
Egypt 1975-80	147.0	100.0	47.0	16.4	6.4	10.0	1.4	18.6	6.6	0.0
Iran 1975-80	400.1	100.0	300.1	31.6	2.4	29.0	8.5	10.9	7.2	0.4
Israel 1975-80	116.6	100.0	16.6	47.9	31.7	13.8	4.8	31.9	5.0	26.0
Jordan 1975-80	129.6	100.0	29.6	14.6	...	...	0.0	12.7	10.2	0.0
Kuwait 1977-80	2075.9	100.0	1975.9	63.8	0.0	63.8	0.0	10.9	0.0	0.0
Oman 1975-80	349.6	100.0	249.6	92.6	0.0	92.6	1.1	1.8	0.0	0.0
Pakistan 1975-80	122.2	100.0	22.2	14.5	8.4	6.2	0.0	42.7	34.5	8.2
Syria 1975-80	273.8	100.0	173.8	20.4	...	...	3.5	14.2	1.8	0.0
Unweighted average	447.9	100.0	347.9	38.9	7.0	37.6	2.2	16.6	7.3	3.8
								30.9	28.5	1.2

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*

Table 21. Middle Eastern Countries: Tax Structure, 1981-85
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:			
					Individual	Corporate				General sales, turnover, or VAT	Excises		Import duties	Export duties		
															Property Taxes	
Bahrain	1981-85	34.8	6.3	28.4	1.1	0.0	1.1	1.4	0.1	0.7	0.0	0.1	2.8	2.8	0.0	0.2
Egypt	1981-85	42.4	25.8	16.6	6.9	...	...	4.6	0.1	4.3	0.0	3.7	7.4	7.0	0.3	0.5
Iran	1981-85	22.2	8.4	13.8	2.2	0.2	2.0	1.8	0.6	1.1	0.1	0.8	2.3	2.1	0.0	0.3
Israel	1981-85	51.8	41.6	10.2	22.0	16.2	4.1	0.0	1.8	14.9	13.4	1.3	2.6	2.2	0.0	0.9
Jordan	1981-85	21.0	15.3	5.7	2.7	...	...	0.0	0.0	2.2	0.0	1.8	7.9	7.9	0.0	1.3
Kuwait	1981-85	70.9	3.1	67.8	1.4	0.0	1.4	0.0	0.0	0.4	0.0	0.0	1.1	1.1	0.0	0.1
Oman	1981-85	39.3	11.9	27.3	10.7	0.0	10.7	0.0	0.2	0.2	0.0	0.0	0.8	0.8	0.0	0.0
Pakistan	1981-85	16.2	12.9	3.2	2.3	...	...	0.0	0.0	5.4	1.0	4.4	5.2	4.8	0.1	0.0
Syria	1981	22.6	8.9	13.7	2.8	...	...	0.0	0.5	1.4	0.0	0.0	3.3	3.0	0.2	0.3
Unweighted average		35.7	14.9	20.7	5.8	3.3	3.9	0.9	0.4	3.4	1.6	1.3	3.7	3.6	0.1	0.4

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 22. Middle Eastern Countries: Tax Structure, 1981-85
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:			
					Individual	Corporate				General sales, turnover, or VAT	Excises		Import duties	Export duties		
															Property Taxes	
Bahrain	1981-85	568.1	100.0	468.1	17.9	0.0	17.9	21.7	1.2	11.2	0.0	11.1	44.9	44.9	0.0	3.1
Egypt	1981-85	164.6	100.0	64.6	26.4	...	...	18.2	0.2	17.1	0.0	14.6	28.4	27.2	1.2	1.8
Iran	1981-85	266.4	100.0	166.4	26.2	2.3	23.8	21.5	6.7	12.6	1.5	8.9	27.8	25.8	0.0	3.2
Israel	1981-85	124.3	100.0	24.3	53.0	38.9	9.9	0.0	4.4	35.9	32.3	3.0	6.3	5.3	0.0	2.2
Jordan	1981-85	136.9	100.0	36.9	17.5	...	...	0.0	0.0	14.2	0.0	11.8	51.6	51.6	0.0	8.4
Kuwait	1981-85	2352.0	100.0	2252.0	44.0	0.0	44.0	0.0	0.0	14.7	0.0	0.0	38.0	38.0	0.0	3.4
Oman	1981-85	329.5	100.0	229.5	89.8	0.0	89.4	0.0	1.4	2.0	0.0	0.0	6.9	6.8	0.0	0.0
Pakistan	1981-85	125.1	100.0	25.1	17.8	...	...	0.0	0.0	41.8	7.9	33.9	40.0	37.6	1.1	0.3
Syria	1981	254.2	100.0	154.2	31.7	...	...	0.0	5.9	15.7	0.0	0.0	37.0	34.3	2.1	3.4
Unweighted average		480.1	100.0	380.1	36.0	8.2	37.0	6.8	2.2	18.3	4.6	8.1	31.2	30.1	0.5	2.9

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 23. Middle Eastern Countries: Tax Structure, 1986-92
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:			
					Individual	Corporate				General sales, turnover, or VAT	Excises		Import duties	Export duties		
															Property Taxes	
Bahrain	1986-90	31.5	8.4	23.0	1.5	0.0	1.5	2.7	0.1	1.2	0.0	0.1	2.7	2.7	0.0	0.1
Egypt	1986-89	32.7	19.4	13.3	4.8	0.5	3.7	4.5	0.0	3.5	0.0	3.3	4.1	4.0	0.1	0.3
Iran	1986-92	14.8	7.5	7.3	2.1	0.4	1.7	1.5	0.4	0.9	0.1	0.7	2.1	1.3	0.0	0.4
Israel	1986-92	38.9	32.0	6.9	15.2	11.1	2.6	0.0	1.2	13.6	12.1	1.2	1.2	0.9	0.0	0.3
Jordan	1986-91	23.5	15.9	7.6	2.7	...	2.0	0.1	0.1	4.1	0.0	3.0	7.0	6.6	0.0	0.8
Kuwait	1986-92	37.7	1.1	36.6	0.2	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.8	0.8	0.0	0.0
Oman	1986-91	35.0	9.0	26.0	7.5	0.0	7.4	0.0	0.2	0.3	0.0	0.0	1.0	1.0	0.0	0.0
Pakistan	1986, 88-91	17.9	13.3	4.6	1.8	0.0	1.8	0.0	0.0	5.9	1.7	4.2	5.6	5.5	0.0	0.0
Syria	1986-91	22.5	15.7	6.8	6.8	...	...	0.0	0.7	1.2	0.0	0.0	1.6	1.3	0.2	0.5
Unweighted average		28.3	13.6	14.7	4.7	1.7	2.6	1.0	0.3	3.4	1.6	1.4	2.9	2.7	0.0	0.3

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 24. Middle Eastern Countries: Tax Structure, 1986-92
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:			Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:		Property Taxes
					Individual	Corporate	...				General sales, turnover, or VAT	Excises		Import duties	Export duties	
Bahrain	1986-92	368.0	100.0	268.0	17.7	0.0	17.7	31.8	1.9	14.4	0.0	1.1	32.6	32.6	0.0	1.7
Egypt	1986-89	168.6	100.0	68.6	24.7	2.5	18.8	23.0	0.0	18.3	0.0	17.1	21.4	20.9	0.5	1.5
Iran	1986-92	198.0	100.0	98.0	28.0	5.7	22.3	20.0	5.0	12.4	1.2	9.0	28.0	16.8	0.0	5.0
Israel	1986-92	121.4	100.0	21.4	47.4	34.7	7.9	0.0	3.8	42.9	38.2	3.8	3.7	2.6	0.0	1.0
Jordan	1986-91	148.6	100.0	48.6	16.6	...	12.4	0.8	0.8	25.7	0.0	19.0	44.3	42.3	0.0	5.1
Kuwait	1986-92	4418.6	100.0	4318.6	27.3	0.0	27.3	0.0	0.0	5.6	0.0	0.0	62.5	62.5	0.0	4.6
Oman	1986-92	391.4	100.0	291.4	82.1	0.0	81.3	0.0	2.1	3.5	0.0	0.0	11.7	11.7	0.0	0.6
Pakistan	1986, 88-91	134.8	100.0	34.8	13.5	0.0	13.4	0.0	0.0	44.5	12.8	31.7	41.8	41.4	0.3	0.3
Syria	1986-91	145.4	100.0	45.4	43.5	...	...	0.0	4.9	7.8	0.3	0.3	10.0	8.6	1.2	3.3
Unweighted average		677.2	100.0	577.2	33.4	6.1	25.2	8.4	2.1	19.4	5.8	9.1	28.5	26.6	0.2	2.6

Sources: IMF, Government Finance Statistics; and International Financial Statistics.

Table 25. Non-OECD Western Hemisphere Countries: Tax Structure, 1975-80
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services				International Trade Taxes						
		Total Revenue	Tax Revenue	Other Revenue	Total	Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:		Property Taxes		
									Individual	Corporate		General sales, turnover, or VAT	Excises		Import duties	Export duties
Argentina	1975-80	18.2	15.2	3.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	9.8	0.3	0.5		
Bahamas	1975-80	28.7	26.4	2.3	11.0	6.6	4.1	4.9	2.5	1.3	0.0	6.4	5.9	1.3		
Barbados	1978-80	17.7	14.3	3.4	2.6	...	0.8	4.5	0.3	4.0	1.0	1.0	0.0	0.0		
Bolivia	1975-80	31.6	24.0	7.6	4.5	2.7	1.6	11.2	8.0	2.5	2.1	2.1	0.0	0.7		
Brazil	1975-80	11.7	10.7	1.0	3.5	1.6	1.9	2.6	1.8	0.7	2.4	1.4	1.0	0.0		
Colombia	1975-80	17.8	16.4	1.4	2.7	2.7	0.0	5.4	1.6	3.7	3.7	2.0	1.7	0.1		
Costa Rica	1975-80	15.4	13.0	2.4	2.8	0.9	1.8	3.2	0.0	2.6	6.2	4.3	1.8	0.1		
Dominican Republic	1975-80	10.8	10.2	0.6	3.3	0.0	2.0	2.0	1.3	0.7	4.4	3.4	0.8	0.2		
Ecuador	1975-80	13.6	13.2	0.3	2.5	1.1	1.0	3.8	1.4	2.0	5.9	1.9	4.0	0.9		
El Salvador	1975-80	10.1	9.4	0.7	1.4	0.3	1.1	3.0	1.4	1.4	3.6	1.7	1.8	0.2		
Guatemala	1975-80	14.2	12.9	1.3	3.3	1.3	2.0	3.6	0.9	2.4	5.3	3.1	2.2	0.1		
Honduras	1975-80	27.2	25.7	1.5	7.4	4.5	2.9	13.6	5.4	7.1	1.6	1.5	0.1	0.7		
Jamaica	1975-80	13.5	12.7	0.8	5.3	2.4	2.8	4.9	2.3	2.0	1.9	0.9	1.1	0.0		
Mexico ¹	1975-80	15.5	13.8	1.7	1.7	1.6	0.0	5.6	1.6	2.5	3.5	3.1	0.4	0.8		
Nicaragua	1975-80	24.5	20.2	4.3	5.4	0.0	0.0	0.0	1.2	2.2	3.0	2.5	0.5	0.6		
Panama	1975-80	11.6	10.5	1.1	1.5	0.0	1.2	2.3	0.6	1.5	2.9	2.0	0.1	0.8		
Paraguay	1975-80	15.7	14.1	1.5	2.9	0.6	2.2	6.3	4.5	1.7	4.0	2.4	1.5	0.7		
Peru	1978-80	34.2	30.5	3.6	8.7	...	...	6.5	4.7	0.3	12.0	11.6	0.1	0.4
St. Kitts	1978-80	23.1	19.5	3.6	5.9	...	...	0.7	0.0	0.4	11.2	10.9	0.3	0.1
St. Lucia	1975-80	21.6	20.5	1.0	1.8	0.5	1.2	9.1	4.7	3.7	2.2	2.2	0.0	0.9		
St. Vincent	1975-80	28.1	22.1	6.1	17.1	0.7	16.2	1.3	0.0	0.9	2.0	1.8	0.0	0.2		
Uruguay	1975-80	19.3	16.9	2.4	4.5	1.5	2.3	4.8	2.1	2.1	4.6	3.6	0.9	0.4		
Venezuela																
Unweighted average																

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 26. Non-OECD Western Hemisphere Countries: Tax Structure, 1975-80
(In percent of total tax revenue)

Sample Size	Domestic Taxes on Goods and Services										International Trade Taxes			
	Taxes on Income, Profits, and Capital Gains					Of which:					Of which:			
	Of which:					General sales, turnover, or VAT					Import duties			
	Total Revenue	Tax Revenue	Other Revenue	Total	Individual	Corporate	Social Security Taxes	Payroll Taxes	Total	Excises	Total	Import duties	Export duties	Property Taxes
Argentina	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bahamas	120.0	100.0	20.0	0.0	0.0	0.0	12.0	0.0	10.2	0.0	70.1	64.5	2.0	3.2
Barbados	108.7	100.0	8.7	41.5	25.0	15.5	9.0	0.8	18.5	9.5	24.5	22.4	1.2	4.8
Bolivia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Brazil	121.4	100.0	21.4	14.7	...	4.3	54.1	2.4	30.2	1.7	...	5.9	0.0	0.0
Chile	132.0	100.0	32.0	18.8	11.4	6.3	17.2	0.0	46.8	33.5	8.7	8.7	0.0	3.0
Colombia	109.8	100.0	9.8	32.5	14.6	17.8	13.7	3.5	23.9	17.2	22.9	13.2	9.6	0.5
Costa Rica	108.6	100.0	8.6	16.8	16.7	0.1	25.5	0.0	33.1	9.9	22.4	12.3	10.2	0.8
Dominican Republic	119.0	100.0	19.0	21.2	7.2	13.8	4.1	0.0	25.4	0.0	47.3	33.6	12.8	0.9
Ecuador	106.2	100.0	6.2	31.7	0.0	19.3	...	0.0	20.0	13.0	43.9	34.0	8.2	1.6
El Salvador	102.6	100.0	2.6	19.3	8.4	8.1	...	0.0	29.3	10.2	44.2	14.5	29.6	7.2
Guatemala	107.0	100.0	7.0	15.0	3.4	11.5	12.4	0.0	32.4	14.9	37.4	17.8	19.1	1.9
Honduras	110.2	100.0	10.2	25.7	9.8	15.7	7.3	0.0	28.4	7.2	41.4	24.3	17.0	0.9
Jamaica	106.0	100.0	6.0	28.9	17.7	11.3	4.0	1.6	52.9	21.0	6.2	5.7	0.5	2.9
Mexico ¹	106.1	100.0	6.1	41.3	19.0	21.8	18.1	1.2	39.3	18.1	14.7	6.8	7.9	0.1
Nicaragua	112.4	100.0	12.4	13.0	9.7	0.0	13.0	0.0	40.6	11.5	25.0	22.9	2.2	5.9
Panama	121.6	100.0	21.6	26.6	0.0	0.0	32.5	0.0	19.7	5.8	15.1	12.6	2.5	3.0
Paraguay	111.0	100.0	11.0	13.9	0.3	11.6	13.8	1.0	22.3	5.5	27.9	19.3	1.1	7.2
Peru	110.8	100.0	10.8	20.5	4.0	15.4	...	3.6	44.9	31.7	28.1	17.0	10.7	4.7
St. Kitts	...	...	...	...	...	...	...	...	...	...	...	...	...	...
St. Lucia	111.9	100.0	11.9	28.5	...	...	7.6	0.0	21.5	15.3	39.2	37.9	0.4	1.4
St. Vincent	118.0	100.0	18.0	30.1	...	...	...	0.0	3.7	0.0	57.5	56.1	1.4	0.7
Uruguay	105.0	100.0	5.0	8.7	2.3	6.0	29.3	0.1	44.6	23.0	10.8	10.6	0.2	4.1
Venezuela	127.5	100.0	27.5	77.2	3.3	73.2	5.3	1.2	5.8	0.0	9.0	8.4	0.0	1.0
Unweighted average	113.1	100.0	13.1	25.0	8.5	13.2	16.4	0.7	28.3	11.9	28.7	21.4	6.5	2.7

Sources: IMF Government Finance Statistics; and International Financial Statistics.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 27. Non-OECD Western Hemisphere Countries: Tax Structure, 1981-85
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services					International Trade Taxes					
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Import duties	Export duties	Property Taxes
						Individual	Corporate				General sales, turnover, or VAT	Excises				
Argentina	1982-85	11.4	10.0	1.4	0.5	...	...	2.4	0.0	4.4	1.6	2.7	1.5	0.5	0.9	0.4
Bahamas	1981-85	22.3	17.4	4.9	0.0	0.0	0.0	1.6	0.0	1.9	0.0	0.1	12.6	11.7	0.2	0.5
Barbados	1981-85	29.1	26.4	2.7	9.2	3.3	5.5	3.5	0.0	6.4	4.0	0.5	4.4	4.1	0.1	1.3
Bolivia	1984-85	5.7	5.2	0.5	0.2	0.1	0.1	0.9	0.0	2.7	0.5	2.4	1.3	0.8	0.4	0.0
Brazil	1981-85	25.7	17.9	7.7	4.0	0.2	1.3	6.2	1.2	5.8	0.4	3.7	0.8	0.4	0.4	0.0
Chile	1981-85	29.4	23.0	6.3	4.3	2.1	2.2	2.7	0.0	11.8	9.4	2.4	2.1	2.0	0.0	0.6
Colombia	1981-85	11.5	9.5	1.9	2.7	1.5	1.2	1.1	0.6	3.2	2.4	0.8	1.7	1.5	0.2	0.0
Costa Rica	1981-85	20.0	18.6	1.4	3.0	2.7	0.2	5.0	0.0	5.8	2.6	3.1	4.8	1.8	2.5	0.1
Dominican Republic	1981-85	12.0	10.2	1.8	2.3	0.9	1.5	0.5	0.0	3.7	0.0	3.2	3.4	2.8	0.4	0.1
Ecuador	1981-85	12.5	12.2	0.3	6.9	0.0	5.6	...	0.0	2.2	1.5	0.7	2.8	2.3	0.3	0.2
El Salvador	1981-85	12.7	11.4	1.3	2.4	1.0	1.1	...	0.0	4.8	2.4	2.0	3.3	1.0	2.3	0.8
Guatemala	1981-85	9.0	7.3	1.7	1.1	0.3	0.9	1.2	0.0	2.8	1.6	1.1	1.8	1.2	0.4	0.1
Honduras	1981	13.1	12.4	0.7	3.2	0.9	2.2	...	0.0	3.4	1.0	2.2	5.6	3.6	2.0	0.1
Jamaica	1981-85	30.3	28.9	1.4	10.5	6.2	3.4	1.4	0.5	11.6	6.3	4.2	2.3	2.3	0.0	0.4
Mexico ¹	1981-85	16.2	14.6	1.5	4.4	2.1	2.3	2.1	0.1	8.6	2.8	1.9	2.3	0.7	1.7	0.0
Nicaragua	1981-85	33.5	28.2	5.2	3.7	...	...	3.6	0.0	14.6	3.0	7.4	4.4	2.3	0.2	1.5
Panama	1981-85	28.2	20.8	7.4	6.4	0.0	0.0	6.3	0.0	4.2	1.7	1.8	2.9	2.5	0.3	0.5
Paraguay	1981-85	10.3	8.7	1.6	1.4	0.0	1.4	1.4	0.1	2.2	0.5	1.4	1.5	1.1	0.0	0.9
Peru	1981-85	14.0	12.3	1.7	1.7	0.3	1.9	...	0.6	6.7	3.6	3.0	3.2	2.7	0.5	0.5
St. Kitts	1985	29.8	22.0	7.8	3.1	0.1	3.0	3.1	0.0	1.5	0.1	0.1	12.9	12.1	0.1	0.4*
St. Lucia	1981-85	34.4	30.2	4.2	10.2	...	2.6	2.0	0.0	6.5	4.6	0.3	11.6	10.2	0.4	0.3
St. Vincent	1981-85	27.7	22.4	5.4	7.4	...	1.6	...	0.0	2.1	0.6	0.3	11.4	10.5	0.4	0.2
Uruguay	1981-85	22.3	20.6	1.7	1.6	0.3	1.2	5.6	0.1	9.5	5.5	3.8	2.6	2.1	0.3	0.9
Venezuela	1981-85	28.7	24.5	4.2	18.1	1.1	16.5	1.1	0.2	1.3	0.0	1.2	3.5	1.6	0.0	0.2
Unweighted average		20.4	17.3	3.1	4.5	1.2	2.5	2.7	0.1	5.3	2.3	2.1	4.4	3.4	0.6	0.4

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 28. Non-OECD Western Hemisphere Countries: Tax Structure, 1981-85
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes					
		Total Revenue	Tax Revenue	Other Revenue	Total	Individual	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Import duties	Export duties	Property Taxes
							Corporate	Excises				General sales, turnover, or VAT	Excises				
Argentina	1982-85	115.3	100.0	15.3	4.9	...	...	...	23.1	0.0	45.1	16.4	27.7	15.0	5.5	8.5	4.3
Bahamas	1981-85	129.0	100.0	29.0	0.0	0.0	0.0	0.0	9.2	0.0	10.7	0.0	0.7	72.7	67.6	1.3	3.1
Barbados	1981-85	110.1	100.0	10.1	35.0	12.5	20.8	15.0	13.4	0.0	24.4	15.0	2.1	16.8	15.5	0.2	4.9
Bolivia	1984-85	111.7	100.0	11.7	2.8	1.2	1.6	6.2	21.8	0.0	40.2	6.2	36.5	27.6	15.3	5.2	0.6
Brazil	1981-85	144.1	100.0	44.1	22.5	1.1	7.5	2.2	34.6	6.5	32.2	2.2	20.2	4.3	2.3	2.0	0.0
Chile	1981-85	127.7	100.0	27.7	18.5	9.0	9.4	40.9	11.5	0.0	51.5	40.9	10.4	9.3	8.7	0.0	2.5
Colombia	1981-85	120.6	100.0	20.6	28.4	16.2	12.3	24.7	11.8	5.8	33.9	24.7	8.7	18.0	15.3	2.5	0.4
Costa Rica	1981-85	107.4	100.0	7.4	16.0	14.8	0.9	13.7	26.6	0.0	30.8	13.7	16.7	26.0	9.9	13.9	0.5
Dominican Republic	1981-85	118.2	100.0	18.2	23.2	8.8	14.5	0.0	4.9	0.0	36.5	0.0	31.5	32.9	27.6	3.6	1.0
Ecuador	1981-85	102.7	100.0	2.7	55.9	0.0	44.6	12.4	...	0.0	18.6	12.4	6.0	23.2	19.3	2.3	1.7
El Salvador	1981-85	111.5	100.0	11.5	21.2	9.1	9.5	21.2	...	0.0	42.7	21.2	17.9	29.0	8.8	20.2	6.7
Guatemala	1981-85	122.0	100.0	22.0	14.9	4.1	10.7	21.3	13.2	0.0	39.5	21.3	15.6	25.9	17.6	5.6	1.7
Honduras	1981-82, 84-85	106.0	100.0	6.0	25.6	7.4	18.1	7.8	...	0.0	27.4	7.8	17.7	45.0	28.6	16.3	1.0
Jamaica	1981, 83-85	105.7	100.0	5.7	36.4	21.7	11.1	21.9	4.8	1.6	40.2	21.9	14.5	8.1	8.1	0.0	1.4
Mexico ¹	1981-85	110.4	100.0	10.4	30.5	14.2	15.8	19.2	14.2	0.8	58.0	19.2	12.8	16.5	4.6	11.8	0.1
Nicaragua	1981-85	118.9	100.0	18.9	13.1	...	...	10.9	13.0	0.0	51.4	10.9	26.3	15.8	8.6	1.0	5.3
Panama	1981-85	135.7	100.0	35.7	31.0	0.0	0.0	8.3	30.0	0.0	20.4	8.3	8.5	13.8	12.0	1.6	2.2
Paraguay	1981-85	119.1	100.0	19.1	16.1	0.0	15.6	6.1	15.6	1.1	25.5	6.1	16.5	16.6	12.6	0.4	10.7
Peru	1981-85	113.5	100.0	13.5	13.8	2.2	14.5	29.2	...	5.1	54.9	29.2	24.5	26.1	22.1	4.0	3.8
St. Kitts	1985	135.4	100.0	35.5	14.0	0.3	13.7	0.5	14.3	0.0	6.8	0.5	0.7	58.7	54.8	0.6	1.9
St. Lucia	1981-85	113.8	100.0	13.8	34.0	...	8.9	15.3	6.5	0.0	21.6	15.3	0.9	38.2	33.6	1.4	1.0
St. Vincent	1981-85	123.9	100.0	23.9	33.1	...	7.0	2.5	...	0.0	9.2	2.5	1.5	51.0	47.0	1.7	0.8
Uruguay	1981-85	108.2	100.0	8.2	7.7	1.7	5.6	26.8	27.1	0.4	46.3	26.8	18.6	12.7	10.2	1.7	4.4
Venezuela	1981-85	117.3	100.0	17.3	73.2	4.3	66.6	0.0	4.5	1.0	5.4	0.0	5.1	14.9	6.5	0.0	0.8
Unweighted average		117.8	100.0	17.8	23.8	6.4	14.0	13.4	15.8	0.9	32.2	13.4	14.2	25.7	19.3	4.4	2.5

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 29. Non-OECD Western Hemisphere Countries: Tax Structure, 1986-92
(In percent of GDP)

	Domestic Taxes on Goods and Services																
	Taxes on Income, Profits, and Capital Gains							Of which:									
	Sample Size	Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	General sales, turnover, or VAT			Of which:		Property Taxes	
						Individual	Corporate				Excises	Import duties	Export duties				
Argentina	1986-89	12.1	10.9	1.1	0.8	0.1	0.0	3.7	0.0	3.5	1.4	2.0	1.7	0.7	0.8	0.7	
Bahamas	1986	21.7	17.9	3.7	0.0	...	...	1.7	0.0	1.8	0.0	0.0	12.6	11.6	0.2	0.7
Barbados	1986-89	31.0	28.8	2.3	7.6	4.3	3.0	4.0	0.7	7.8	5.4	0.2	4.0	4.0	0.0	1.5	
Bolivia	1986-91	11.6	7.6	4.0	0.5	0.1	0.2	1.0	0.0	3.9	1.9	1.9	1.2	1.0	0.1	0.6	
Brazil	1986-91	25.9	16.0	9.8	4.2	0.2	1.2	5.9	1.0	4.4	1.0	2.5	0.5	0.5	0.1	0.0	
Chile	1986-92	26.1	20.5	5.6	4.1	...	...	1.9	0.0	10.9	8.4	2.4	2.6	...	...	0.1
Colombia	1986-89	12.8	11.4	1.3	3.4	1.6	1.7	1.4	0.5	3.5	2.8	0.7	2.4	2.2	0.2	0.0	
Costa Rica	1986-91	23.8	20.4	3.4	2.3	1.8	0.4	6.6	0.0	5.7	2.7	2.6	6.1	4.1	1.9	0.1	
Dominican Republic	1986-90	14.5	12.9	1.6	2.7	1.2	1.5	0.6	0.0	3.7	0.0	2.9	5.7	5.0	0.4	0.1	
Ecuador	1986-90	14.6	14.3	0.3	7.7	0.0	6.3	...	0.0	3.4	2.7	0.6	2.6	2.4	0.0	0.2	
El Salvador	1986-92	10.2	9.7	0.5	2.2	0.8	1.3	...	0.0	4.3	2.8	1.3	2.5	1.1	1.4	0.6	
Guatemala	1986-89	9.4	8.4	1.1	1.6	0.4	1.2	...	0.0	2.6	1.1	1.2	3.5	2.7	0.7	0.2	
Honduras	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jamaica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mexico ¹	1986-90	16.6	14.4	2.2	4.8	2.2	2.5	2.0	0.1	9.6	3.2	2.3	0.8	0.8	0.0	0.0	
Nicaragua	1986, 88-91	22.0	18.9	3.0	3.5	...	...	1.8	0.0	10.3	2.1	7.5	2.3	2.3	0.0	0.4
Panama	1986-91	28.2	19.2	9.0	5.1	0.2	0.8	6.2	0.0	4.3	1.5	1.9	2.7	2.5	0.2	0.4	
Paraguay	1986-90	10.6	8.7	2.0	1.2	0.0	1.2	0.8	0.1	2.5	0.8	1.6	1.6	1.2	0.0	1.0	
Peru	1986-92	9.6	8.8	0.8	1.5	0.2	0.7	...	0.0	5.1	1.8	3.3	1.4	1.4	0.1	0.5	
St. Kitts	1986-90	28.4	21.6	6.9	3.8	1.3	2.5	1.3	0.0	3.9	2.1	0.5	11.2	10.1	0.3	0.4	
St. Lucia	1986-91	30.8	28.1	2.7	7.8	2.9	3.8	...	0.0	9.8	7.9	0.1	9.7	8.3	0.4	0.2	
St. Vincent	1986-90	27.5	22.9	4.5	6.4	3.5	2.7	...	0.0	3.5	0.5	0.3	12.2	11.7	0.5	0.2	
Uruguay	1986-91	25.4	24.0	1.4	1.9	0.6	1.1	7.0	0.2	10.2	6.6	3.5	2.7	2.1	0.1	1.2	
Venezuela	1986-92	21.2	16.7	4.5	11.8	...	10.0	0.9	0.0	1.2	0.0	1.2	2.4	1.9	0.0	0.1	
Unweighted average		19.7	16.5	3.3	3.9	1.2	2.2	2.9	0.1	5.3	2.6	1.8	4.2	3.7	0.4	0.4	

Sources: IMF Government Finance Statistics; and International Financial Statistics.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 30. Non-OECD Western Hemisphere Countries: Tax Structure, 1986-92
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes				
		Total Revenue	Tax Revenue	Other Revenue	Of which:			Social Security Taxes	Payroll Taxes	Total	Of which:		Of which:			
					Total	Individual	Corporate				General sales, turnover, or VAT	Excises	Total	Import duties	Export duties	
																Property Taxes
Argentina	1986-89	110.4	100.0	10.4	6.7	0.7	0.1	35.2	0.0	30.3	11.7	17.2	16.4	6.4	7.9	6.6
Bahamas	1986	120.9	100.0	20.9	0.0	...	...	9.2	0.0	10.3	0.0	0.0	70.2	64.9	1.0	3.6
Barbados	1986-89	107.9	100.0	7.9	26.4	15.2	10.3	14.0	2.4	26.9	18.9	0.7	13.9	13.9	0.0	5.4
Bolivia	1986-92	152.9	100.0	52.9	6.7	0.8	2.7	12.7	0.0	51.5	27.6	23.1	14.6	13.1	1.2	8.7
Brazil	1986-91	161.1	100.0	61.1	26.4	1.5	7.5	36.5	6.2	27.4	6.3	15.5	3.4	2.8	0.6	0.1
Chile	1986-92	127.2	100.0	27.2	20.0	...	...	9.1	0.0	53.2	41.3	11.8	12.7	...	...	0.3
Colombia	1986-89	111.5	100.0	11.5	29.6	14.3	15.3	12.3	4.7	30.8	24.5	6.0	21.0	19.1	1.6	0.2
Costa Rica	1986-91	116.9	100.0	16.9	11.2	8.9	1.8	32.4	0.0	28.1	13.6	13.0	29.8	20.1	9.2	0.6
Dominican Republic	1986-90	112.4	100.0	12.4	21.1	9.0	11.9	4.4	0.0	28.2	0.0	22.6	43.7	38.4	3.0	0.9
Ecuador	1986-90	102.3	100.0	2.3	53.6	0.0	43.8	...	0.0	24.1	19.2	4.3	18.4	17.1	0.0	1.6
El Salvador	1986-92	105.2	100.0	5.2	22.6	8.7	13.4	...	0.0	45.4	29.2	13.9	24.7	12.3	12.3	6.5
Guatemala	1986-89	113.3	100.0	13.3	18.8	4.4	14.2	...	0.0	31.5	13.8	14.2	41.8	31.7	8.8	2.0
Honduras	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jamaica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mexico ¹	1986-90	114.8	100.0	14.8	33.3	14.7	17.1	13.7	0.8	66.4	22.0	15.6	5.4	5.3	0.1	0.0
Nicaragua	1986, 88-90	114.0	100.0	14.0	18.6	...	...	9.9	0.0	50.9	11.2	37.5	14.3	14.3	0.0	2.3
Panama	1986-91	147.7	100.0	47.7	26.2	1.0	4.6	32.9	0.0	22.7	7.6	10.2	13.8	12.8	0.8	2.3
Paraguay	1986-90	122.3	100.0	22.3	14.3	0.0	14.3	9.1	1.2	28.5	9.1	18.3	18.8	13.7	0.0	11.1
Peru	1986-92	109.3	100.0	9.3	16.6	2.0	8.1	...	0.0	58.8	21.1	37.0	16.3	15.6	0.7	5.6
St. Kitts	1986-92	135.3	100.0	35.3	18.9	6.6	12.3	4.0	0.1	16.2	6.6	2.6	54.7	49.5	1.3	2.1
St. Lucia	1986-91	109.5	100.0	9.5	27.7	10.4	13.3	...	0.0	34.6	28.0	0.4	34.8	29.6	1.6	0.8
St. Vincent	1986-90	119.8	100.0	19.8	28.1	15.2	11.8	...	0.0	15.3	2.2	1.3	53.2	51.0	2.2	0.9
Uruguay	1986-91	105.9	100.0	5.9	7.8	2.5	4.6	29.2	0.6	42.9	27.6	14.6	11.2	8.7	0.5	5.0
Venezuela	1986-92	127.1	100.0	27.1	70.7	...	59.2	5.6	0.2	7.4	0.0	7.3	14.2	11.6	0.0	0.8
Unweighted average		120.4	100.0	20.4	23.0	6.4	14.0	16.9	0.7	33.3	15.5	13.0	24.9	21.5	2.5	3.1

Sources: IMF, *Government Finance Statistics*; and *International Financial Statistics*.

¹ Mexico joined the OECD in May 1994. Nevertheless, since Mexico was not a member of the OECD during the sample period covered, it is included in the group of non-OECD Western Hemisphere countries.

Table 31. Eastern Europe and Former Soviet Union Countries: Tax Structure, 1975-80
(In percent of GDP)

	Domestic Taxes on Goods and Services																
	Taxes on Income, Profits, and Capital Gains						Of which:						International Trade Taxes				
	Sample Size	Total Revenue	Tax Revenue	Other Revenue	Total	Individual	Corporate	Social Security Taxes	Payroll Taxes	Total	General sales, turnover, or VAT	Excises	Total	Import duties	Export duties	Property Taxes	
Albania
Armenia
Azerbaijan
Belarus
Bulgaria
Czech Republic
Estonia
Georgia
Hungary
Kazakhstan
Kyrgyz Republic
Latvia
Lithuania
Macedonia
Moldova
Poland
Romania	1980	45.3	10.1	35.2	0.0	0.0	0.0	5.9	4.2	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0
Russian Federation
Slovak Republic
Slovenia
Tajikistan
Turkmenistan
Ukraine
Uzbekistan
Unweighted average		45.3	10.1	35.2	0.0	0.0	0.0	5.9	4.2	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0

Sources: IMF, *Economic Reviews*; IFS, *Supplement on Countries of the Former Soviet Union*; and *Government Finance Statistics*.

Table 32. Eastern Europe and Former Soviet Union Countries: Tax Structure, 1975-80
(In percent of total tax revenue)

	Domestic Taxes on Goods and Services												
	Sample Size	Taxes on Income, Profits, and Capital Gains								International Trade Taxes			
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		
						Individual	Corporate				General sales, turnover, or VAT	Excises	Import duties	Export duties	Property Taxes
Albania
Armenia
Azerbaijan
Belarus
Bulgaria
Czech Republic
Estonia
Georgia
Hungary
Kazakhstan
Kyrgyz Republic
Latvia
Lithuania
Macedonia
Moldova
Poland
Romania	1980	448.5	100.0	348.5	0.0	0.0	0.0	58.8	41.2	0.0	0.0	0.0	0.0
Russian Federation
Slovak Republic
Slovenia
Tajikistan
Turkmenistan
Ukraine
Uzbekistan
Unweighted average		448.5	100.0	348.5	0.0	0.0	0.0	58.8	41.2	0.0	0.0	0.0	0.0

Sources: IMF, *Economic Reviews*; IFS, *Supplement on Countries of the Former Soviet Union*; and *Government Finance Statistics*.

Table 33. Eastern Europe and Former Soviet Union Countries: Tax Structure, 1981-85
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains					Domestic Taxes on Goods and Services					International Trade Taxes		
		Total Revenue	Tax Revenue	Other Revenue	Total	Social Security Taxes	Payroll Taxes	Total	General sales, turnover, or VAT	Excises	Total	Total	Of which:	
													Import duties	Export duties
Albania
Armenia
Azerbaijan
Belarus
Bulgaria
Czech Republic
Estonia
Georgia
Hungary	1981-85	53.3	45.8	7.5	8.8	10.3	0.4	19.4	8.4	0.5	3.5	2.9	0.0	2.2
Kazakhstan ¹	1985	33.4	32.3	1.1	14.4	3.8	...	13.9	13.9	...	...	...	...	...
Kyrgyz Republic
Latvia
Lithuania
Macedonia
Moldova
Poland	1984-85	43.6	41.5	2.0	9.5	10.7	4.8	13.0	13.0	0.0	2.9	1.3	0.9	0.7
Romania	1981-85	37.4	10.0	27.5	0.0	5.8	4.1	0.0	...	0.0	0.0	0.0	0.0	0.0
Russian Federation
Slovak Republic
Slovenia
Tajikistan
Turkmenistan
Ukraine
Uzbekistan
Unweighted average		41.9	32.4	9.5	8.2	7.6	3.1	11.6	11.7	0.2	2.1	1.4	0.3	1.0

Sources: IMF, *Economic Review*; IFS, *Supplement on Countries of the Former Soviet Union*; and *Government Finance Statistics*.

¹General government.

Table 34. Eastern Europe and Former Soviet Union Countries: Tax Structure, 1981-85
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services							International Trade Taxes			
		Total Revenue	Tax Revenue	Other Revenue	Total	Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Of which:				
									Individual	Corporate		General sales, turnover, or VAT	Excises	Import duties	Export duties	
																Property Taxes
Albania	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Armenia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Azerbaijan	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Belarus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bulgaria	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Czech Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Estonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Georgia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hungary	1981-85	116.5	100.0	16.5	19.3	0.6	18.7	22.5	0.9	1.1	42.4	6.3	0.1	4.8		
Kazakhstan ¹	1985	103.3	100.0	3.3	44.6	16.2	28.4	11.7	...	...	43.0	...	...	...
Kyrgyz Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Latvia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lithuania	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Macedonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Moldova	1985	100.0	100.0	0.0	40.0	6.4	33.6	...	...	...	49.5	...	...	...
Poland	1984-85	104.9	100.0	4.9	22.9	0.0	22.9	25.7	11.5	0.0	31.3	3.0	2.1	1.7		
Romania	1981-85	374.7	100.0	274.7	0.0	0.0	0.0	58.4	41.6	0.0	0.0	0.0	0.0	0.0		
Russian Federation	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slovak Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slovenia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tajikistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Turkmenistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ukraine	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Uzbekistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Unweighted average		159.9	100.0	59.9	25.3	4.6	20.7	29.6	18.0	0.4	33.2	25.5	0.4	3.1	0.7	2.1

Sources: IMF, *Economic Reviews*; IFS, *Supplement on Countries of the Former Soviet Union*; and *Government Finance Statistics*.

¹General government.

Table 35. Eastern Europe and Former Soviet Union Countries: Tax Structure, 1986-92
(In percent of GDP)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services				International Trade Taxes					
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Of which:		Total	Of which:		
						Individual	Corporate			General sales, turnover, or VAT	Excises		Import duties	Export duties	
Albania	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Armenia ¹	1991	25.6	15.5	10.1	...	...	...	...	...	...	...	...	...	...	...
Azerbaijan ²	1989-90	24.4	19.8	4.5	8.2	1.9	6.3	...	11.5	...	0.1	...	...	...	0.1
Belarus ³	1991-92	45.2	29.0	16.2	10.7	2.3	8.0	9.5	2.6	13.6	0.9	...	...	0.0	0.3
Bulgaria	1987-90	74.8	50.2	24.6	24.6	3.9	20.7	9.6	0.0	7.1	4.3	4.1	2.0	0.0	0.3
Czech Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Estonia ³	1991	37.4	34.7	2.7	14.4	6.7	7.7	8.0	...	6.1	4.1	2.1	2.1	0.0	0.0
Georgia ⁴	1991-92	21.9	16.8	5.1	8.0	2.3	5.7	...	...	7.4	1.0	0.4	...	...	0.1
Hungary	1986-90	54.3	47.5	6.8	9.3	1.1	8.2	14.3	1.2	7.1	5.1	3.2	2.7	0.1	0.7
Kazakhstan ³	1986-91	25.3	24.1	1.1	10.7	4.3	6.4	3.7	...	10.0	...	...	...	...	...
Kyrgyz Republic ⁴	1987-91	37.3	25.1	12.2	8.3	3.4	4.9	4.2	...	13.1	...	...	...	...	...
Latvia ⁴	1991-92	28.8	25.9	2.9	5.5	1.5	4.1	10.4	...	8.0	4.9	0.2	0.1	0.2	0.1
Lithuania ³	1988-92	43.7	38.5	5.3	14.1	5.0	9.1	7.6	0.0	15.6	...	0.4	...	...	0.3
Macedonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Moldova ²	1988-91	30.0	27.0	3.1	9.3	2.0	7.3	...	...	16.1	3.3	...	...	...	...
Poland	1986-88	39.0	36.7	2.3	11.0	0.0	11.0	9.2	1.1	11.7	0.0	2.6	1.3	0.4	0.9
Romania	1986-91	43.0	17.9	25.2	3.2	1.3	1.9	7.1	4.0	3.3	0.0	0.2	0.2	0.0	0.0
Russian Federation ⁵	1992	29.9	...	...	11.4	2.5	9.0	...	...	13.0	1.5	2.6	0.3	1.8	...
Slovak Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slovenia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tajikistan ²	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Turkmenistan ⁶	1991	29.2	7.8	21.5	2.4	0.2	1.2	...	...	6.0	...	6.0	...	...	...
Ukraine ²	1991-92	27.5	25.2	2.3	11.4	3.3	8.1	...	1.9	11.2	0.7	0.2	0.2	...	...
Uzbekistan	1987-91	...	23.0	...	9.3	3.4	5.8	3.0	...	11.3	...	...	...	...	...
Unweighted average		36.3	27.3	9.1	10.1	2.7	7.4	7.9	1.5	11.5	8.7	2.2	1.1	0.3	0.3

Sources: IMF, *Economic Review*; IPS, *Supplement on Countries of the Former Soviet Union*; and *Government Finance Statistics*.

¹Consolidated accounts of republic and local authorities.

²State budget.

³General government.

⁴Central government.

⁵Cumulative fiscal accounts.

⁶Central and local governments.

Table 36. Eastern Europe and Former Soviet Union Countries: Tax Structure, 1986-92
(In percent of total tax revenue)

	Sample Size	Taxes on Income, Profits, and Capital Gains				Domestic Taxes on Goods and Services				International Trade Taxes						
		Total Revenue	Tax Revenue	Other Revenue	Total	Of which:		Social Security Taxes	Payroll Taxes	Total	Of which:		Total	Import duties	Export duties	Property Taxes
						Individual	Corporate				General sales, turnover, or VAT	Excises				
Albania	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Armenia ¹	1991	165.0	100.0	65.0	...	...	...	...	...	...	...	...	...	...	...	...
Azerbaijan ²	1989-90	122.6	100.0	22.6	41.4	9.7	31.7	...	58.0	58.0	...	0.4	...	...	...	0.3
Belarus ³	1991-92	157.4	100.0	57.4	37.1	7.4	25.7	32.0	8.3	56.7	47.9	8.9	2.7	...	0.0	1.1
Bulgaria	1987-90, 92	142.9	100.0	42.9	45.7	7.5	38.2	22.6	1.0	21.7	12.9	8.7	7.7	4.3	0.0	0.5
Czech Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Estonia ³	1991	108.0	100.0	8.0	40.8	20.6	20.2	26.4	...	28.4	20.2	8.2	3.9	...	...	0.0
Georgia ⁴	1991-92	128.9	100.0	28.9	47.8	12.8	35.0	...	...	49.4	40.8	8.6	2.8	...	...	0.2
Hungary	1986-90	114.4	100.0	14.4	19.6	2.4	17.2	30.2	2.4	37.7	14.9	10.8	6.7	5.8	0.3	1.4
Kazakhstan ³	1986-91	105.0	100.0	5.0	44.7	17.6	27.1	14.7	...	41.4	41.0	...	...	...	...	...
Kyrgyz Republic ⁴	1987-91	152.9	100.0	52.9	33.8	13.7	20.1	15.4	...	52.4	52.4	...	...	...	...	...
Latvia ⁴	1991-92	112.4	100.0	12.4	21.3	5.7	15.5	41.2	...	30.5	18.3	10.4	0.8	0.5	1.1	0.5
Lithuania ³	1988-92	113.3	100.0	13.3	36.6	13.2	23.4	20.0	0.0	40.3	12.6	...	0.9	...	...	0.8
Macedonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Moldova ²	1985-91	109.1	100.0	9.1	37.6	7.4	30.2	...	...	56.1	11.5	...	...	...	...	...
Poland	1986-88	106.2	100.0	6.2	30.1	0.0	30.1	25.1	3.0	31.9	31.8	0.0	7.0	3.6	1.0	2.4
Romania	1986-91	327.5	100.0	227.5	9.9	4.0	5.9	47.2	31.7	10.3	...	0.0	0.7	0.7	0.0	0.0
Russian Federation ⁵	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slovak Republic	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slovenia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tajikistan ²	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Turkmenistan ⁶	1991	376.9	100.0	276.9	31.6	0.1	31.5	...	...	68.4	68.4	...	76.9	...	...	...
Ukraine ²	1991-92	109.3	100.0	9.3	45.8	13.2	32.6	...	7.4	44.1	41.4	2.6	1.0	...	...	...
Uzbekistan	1987-91	...	100.0	...	40.7	14.9	25.8	12.4	...	49.5	49.5	...	...	...	...	...
Unweighted average		153.2	100.0	53.2	35.3	9.4	25.6	26.1	7.7	42.3	34.8	6.5	9.3	2.8	0.3	0.7

Sources: IMF, *Economic Reviews*; IFS *Supplement on Countries of the Former Soviet Union*; and *Government Finance Statistics*.

¹Consolidated accounts of republican and local authorities.

²State budget.

³General government.

⁴Central government.

⁵Cumulative fiscal accounts.

⁶Central and local governments.

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